

**WAR  
SERVICE  
ISSUE**

**APRIL 1942**

**IN THIS ISSUE**

He, Too, Helps Win  
the War  
by Bill Toboldt

1942 Service  
Manual

Compiled by  
Bob Hankinson

Passenger Car  
Tune-Up  
Specifications  
1937-42 Inclusive

Truck, Tractor,  
Industrial Engine  
Tune-Up and Repair  
Data

And Hundreds of Other  
Helpful and Profitable  
Ideas

APR 20 1942

Engineering  
Library

# MOTOR AGE

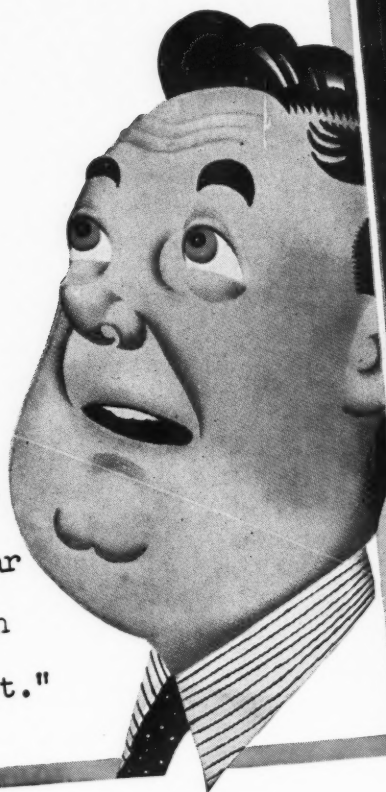
FOR AUTOMOTIVE SERVICEMEN

A CHILTON PUBLICATION





"Who buys all the  
piston rings anyhow?  
I never bought a set  
in my life."



"Well brother, you're  
going to get piston  
ring conscious. Other-  
wise you may wind up  
with a premature jalopy  
-- made that way by your  
own neglect -- and with  
no chance to replace it."

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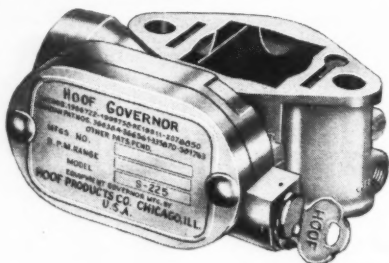
MILES 12.8 at 65 MPH  
MILES 15.4 at 55 MPH  
MILES 17.2 at 45 MPH  
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# MOTOR AGE

With Which is Combined AUTOMOBILE TRADE JOURNAL

FOR AUTOMOTIVE SERVICEMEN

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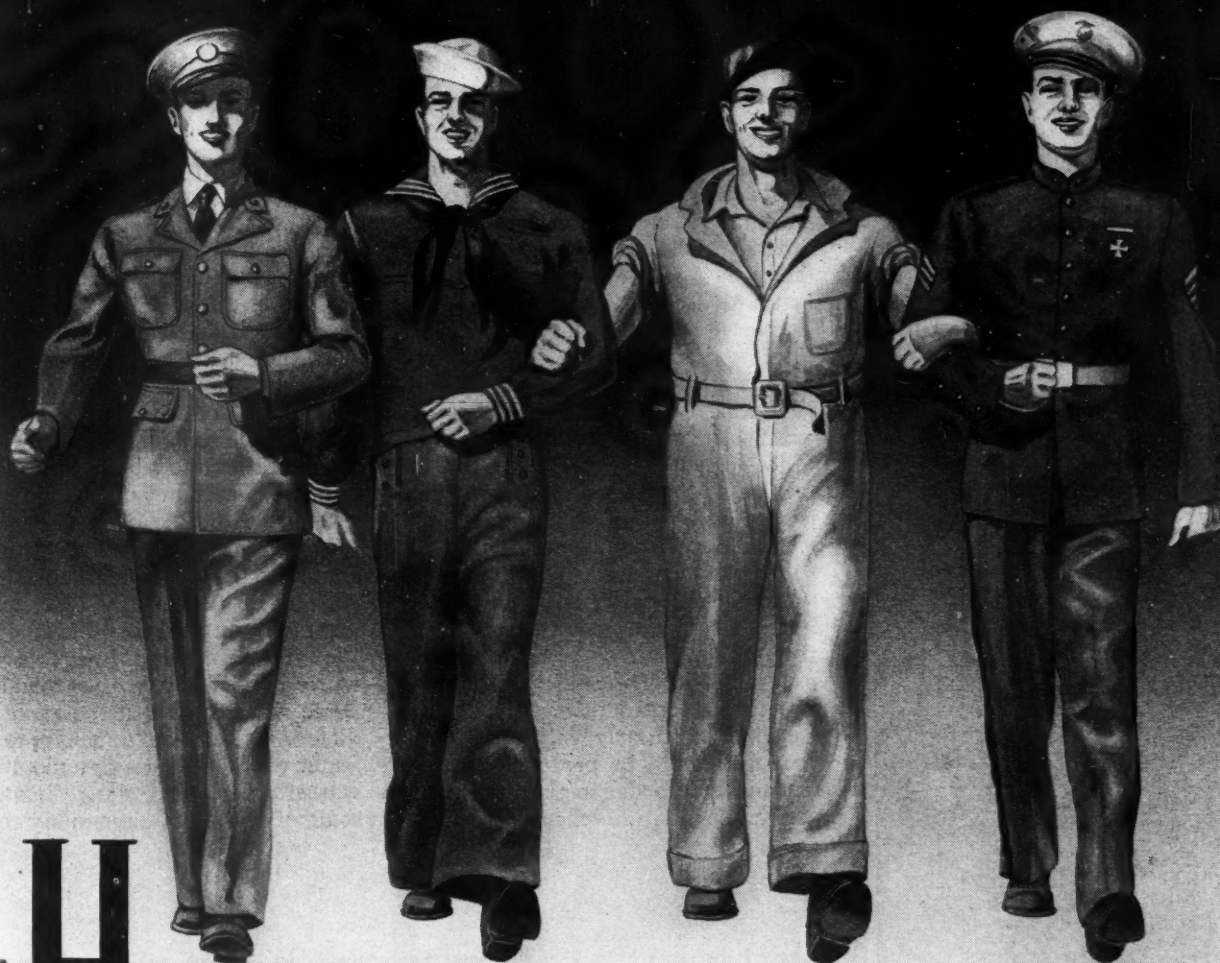
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# MOTOR AGE

A P R I L • 1 9 4 2



**H**E, TOO,

**HELPS WIN THE WAR**

**E**VERY service man is playing a part of ever-increasing importance in the national war effort. In fact, the success or failure of the military forces may hinge on the repairman's ability to keep passenger cars and trucks rolling at maxi-

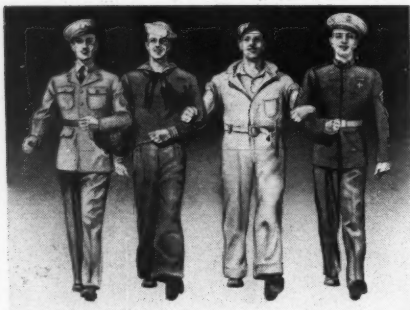
*By Bill Toboldt*

mum efficiency with a minimum of new parts.

Without such precision maintenance, thousands of war workers will be unable to reach the muni-

tions factories in order to produce the tanks, ships, trucks, shells, torpedoes and planes which are so urgently needed by our armed forces.

The repair shops of America have, therefore, what may be con-



## HE TOO, HELPS

sidered as a two-fold job. First, the repairman must do a thorough maintenance job designed to get the utmost in mileage from gasoline, oil, tires and parts. Secondly, he must act as a missionary for the transportation system of the United States and sell the car owner on the importance of bringing the car to the service station at frequent intervals in order to maintain it in economical running order.

While automotive mechanics are familiar with precision maintenance

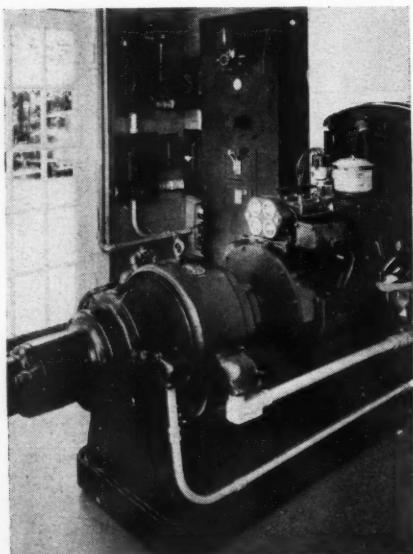
methods, and while they have not wasted any parts during peace time, automotive maintenance procedure during the war period presents many new problems, which have to be studied carefully.

Every possible means must be used to increase the life of parts and various units. In fact, their life must be extended far beyond what was considered possible during peace time. And it is up to the mechanic to determine when such parts have become worn to such an extent that consumption of fuel, oil, or tires is increased.

On such a basis, piston rings, for instance, should be replaced more frequently than they have in the past since their condition directly affects the consumption of fuel and gasoline. Similarly valve jobs and tune-up should be performed more frequently in order to get most miles per gallon and alinement of wheels

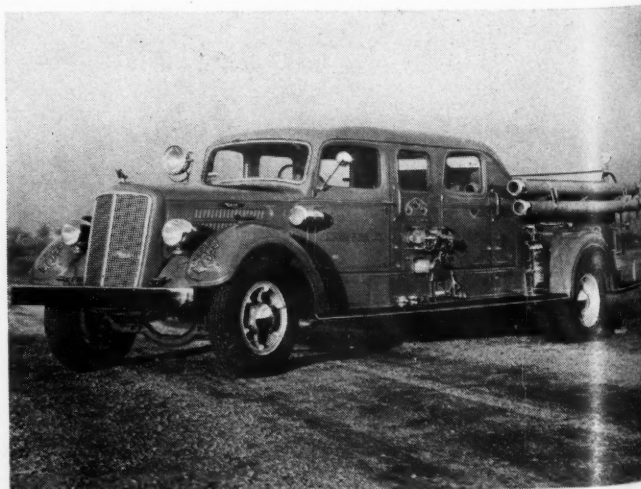
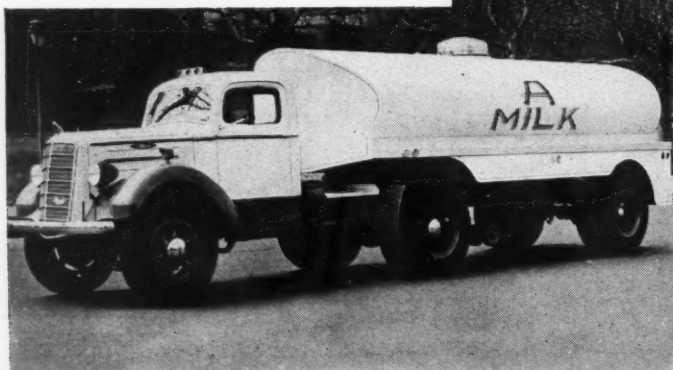
together with wheel balance should be checked more often in order to lengthen tire life.

However, parts such as shock absorbers present a somewhat different problem. There are four to the car and it is absolutely necessary that they operate perfectly in order to reduce wheel bounce and the attendant spinning of wheels and shortened tire life. Their functioning and the fluid level should, therefore, be checked every 5000 miles or oftener. However, suppose a shock absorber or shock absorber link is found to be defective. Should all four units be replaced? That was common practice in the past, the thought being that when one is worn or defective, the remaining three will soon be in the same condition. However, such practice under war conditions is undoubtedly wasteful, for in many instances some of the units have many thous-



Some of the types of vehicles that must be maintained throughout the war are shown in these photographs. In most cases, this has already been recognized by the government in making tires, either new or retreaded,

available to such vehicles. Replacement parts are to be made available through the huge stock of parts now being piled up by the factories. Cars driven by physicians, war workers, and certain classes of salesmen



# WIN THE WAR

and miles of life remaining. This factor is of particular importance in connection with the replacement of shock absorber links as they contain rubber.

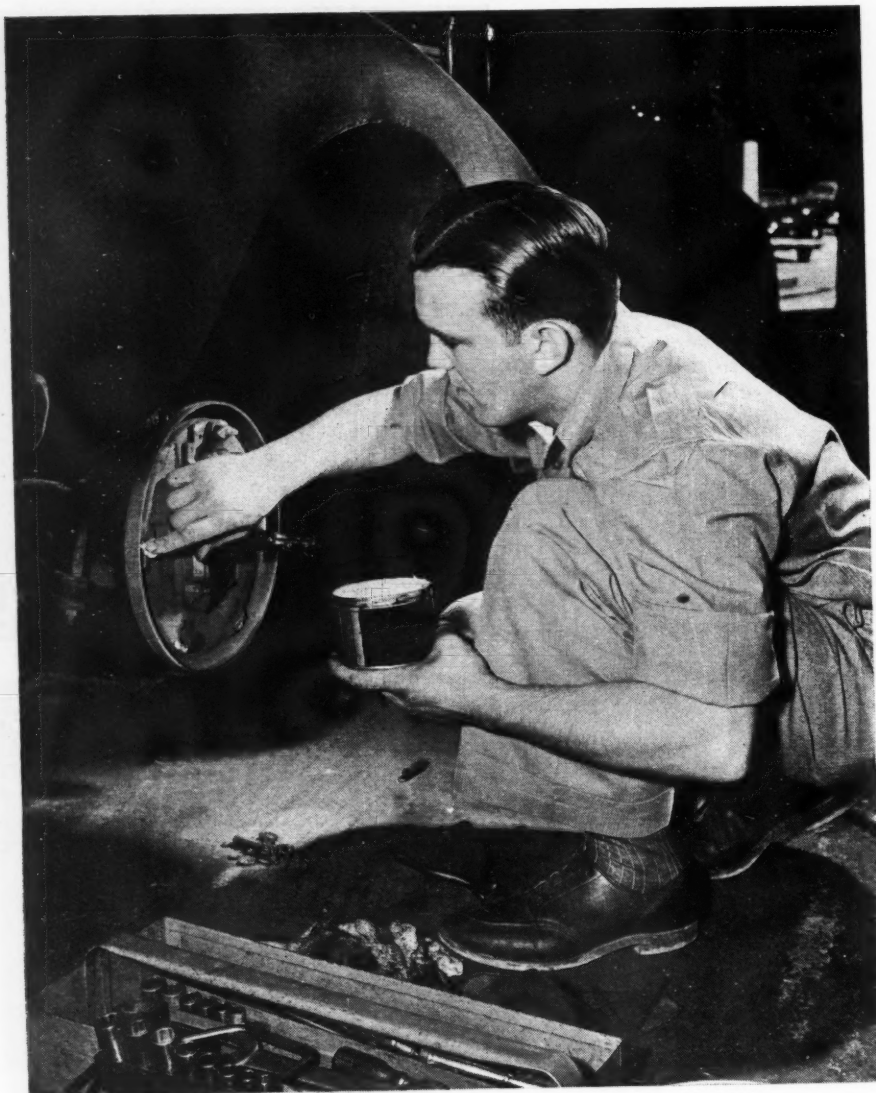
This same thought would also apply to many other parts and units, but it must always be remembered that the saving of gasoline, oil and tires is paramount.

The second duty of America's automotive maintenance men, as mentioned at the beginning of this article, is to sell the car owner on the importance of bringing his car to the service station at frequent intervals, so that it can be maintained in topnotch condition. This cannot be overemphasized. For, unless the car owner brings the car in for service, the repairman will not have the opportunity to maintain it in economical operating order, thereby increasing the cost of operation and

*(Continued on Page 87)*

also will have to be kept running. Servicemen are the only ones who can provide the necessary maintenance and repair service. Every essential car they keep in operation is a contribution toward winning the war.





## PROTECT THE BRAKE LINING

**Preventive maintenance can prolong the life of lining and so make the present supply available for more automobiles, thus keeping them on the road longer**

**W**HENEVER mechanics gather together these days, the conversation invariably turns to the subject of parts—particularly those parts which are hard to get to make necessary replacements. While there may be only a few on that list at the present time, there is much speculation about other parts which may soon be placed on the "back order" list.

So it becomes increasingly evident that the job of the automobile repairman today is to determine what repairs or adjustments can be made to parts already in service to make them last longer—to postpone the day when replacement of the part is necessary.

Take the subject of brakes, for example. There are some operations of a preventive nature that can be done to prolong the life of brake lining, and, in the light of present conditions, it might be well to review those operations.

1. Check brake adjustments frequently to be sure that each wheel is doing its full share of the job.

2. Check the anchor-pin adjustment to be sure that the shoe is centralized in the drum, and that it is giving full-surface contact. Quite frequently it happens that the upper half of the lining—from the toe end, halfway to the anchor end—does all the work. This is because the anchor pin is not properly adjusted to permit the anchor end of the shoe to contact the drum.

3. Put a little lubricant on the brake backing plate where the edge of the shoe slides, so it will be able to return to the "off" position easily. Check the brake-shoe return springs to be sure they are strong enough to return the shoes to the "off" position, and prevent them from dragging against the drum.

4. Examine the contact surface of the drums, and turn them down if they are scored. Scored drums increase brake lining wear and cut down effective braking area.

5. Check the brake-pedal free travel, to be sure it is allowing the master cylinder piston to return far enough to uncover the fluid by-pass port so the fluid can return to the reservoir. If this port is not uncovered, the brakes will drag.

No mechanic likes to do a half-way job, and, when it comes to relining brakes, the standard practice has been to reline all shoes when doing a job, the theory being that shoes with worn lining could not be expected to work properly with shoes with new lining.

*(Continued on Page 72)*

CAR manufacturers and equipment manufacturers have long preached the gospel of "preventive maintenance," but to many repairmen it has been nothing more than a trick phrase by which they have been able to sell a little extra work. Today it is being revealed in its true sense, and car owners are beginning to realize that it means just what it says—a means of preventing certain parts from wearing out by correcting conditions which contribute to excessive wear before the wear is apparent on the part itself.

Take front wheel alinement for example. The idea of having front wheels checked for alinement was, to many owners, just a sales approach to a big repair bill. Now, when it is impossible for the average car owner to buy new tires, he is beginning to realize that wheel alinement is one of the biggest factors which determine just how much service a tire can be made to give.

So wheel alinement comes into its own. No longer can the average car owner afford to wait until his tires begin to show signs of unusual or excessive wear before he has the wheels checked to find out what is wrong. Tires are too precious! So he is beginning to appreciate the value of "preventive maintenance"—in this case, a frequent check of the points of front wheel alinement to prolong the life of his tires.

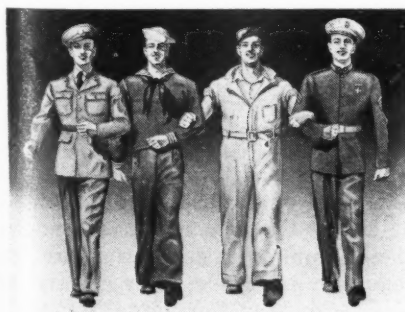
Another important factor, and one that would be brought to light by a front-end check, is inflation pressure. Over-inflation causes rapid wear in the center of the tread, while under-inflation causes rapid wear on the sides of the tread. Proper inflation distributes the load over the entire tread area and enables the tire to deliver its maximum life.

Tires should be checked for inflation pressure once a week. Test them with a gage first to determine the pressure loss since the last inflation, and call the owner's atten-



## PROLONGING TIRE LIFE

**Regular check of tire inflation  
and wheel alinement can do much  
to offset the shortage of rubber**



tion to any tire which shows a pressure loss greater than the others. That tire is advertising that it has a slow leak and, if not repaired, will go flat at the most inconvenient time. It may be a slow leak due to a puncture, or it may be a valve core rubber seat that is leaking, due either to dirt which entered the valve stem or to natural wear. At any rate, the cause should be determined and corrected. All valve

stems should be protected by caps. They not only keep dirt and water away from the valve core, but also act as a check for air which may leak past the valve core seat.

Of course, the manner in which the owner operates the car has a lot to do with tire wear. High speeds burn up tread rubber at an alarming rate. Caution your owners to hold the speed of the

*(Continued on Page 74)*

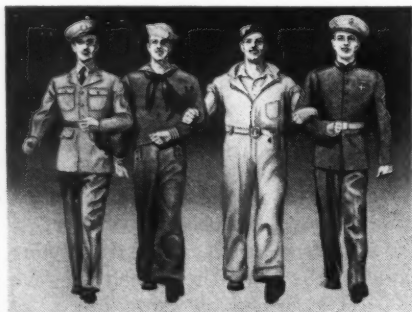
**E**VERYONE knows that a good engine tune-up puts new life in the old power plant, improves performance and cuts down gasoline consumption. And that's important in these days of reduced gasoline supply.

But equally important is the fact that performing an engine tune-up gives the mechanic an opportunity to check the electrical units of the car so that potential trouble can be discovered before it becomes actual trouble. Because practically everything used in the electrical system is made of materials which are essential to the war effort, the replacement of any of these parts should be made sparingly, and after good judgment dictates that the original part is no longer serviceable. In these days of present and possibly future parts shortages, it is up to every mechanic to make the parts that are available cover as many cars as possible.

A good electrical check-up starts with the battery. The cable terminals should be examined for corrosion, and checked for being tight. If corroded, the terminal should be removed from the post and the terminal and the post cleaned with a wire brush. If the terminal has been weakened by the corrosion but the rest of the cable is in good condition, consideration should be given to the installation of a new terminal only, which can be soldered to the old cable. When installed on the post, be sure the connection is tight and, as a further precaution against corrosion, coat the terminal and the post with petroleum jelly.

A hydrometer reading of the battery should show a specific gravity of 1.250 or better; if the reading is as low as 1.225, an immediate recharge is indicated, as well as a further check of the charging circuit.

To check the output of the generator, and the setting of the voltage regulator, an accurate ammeter and voltmeter are needed.



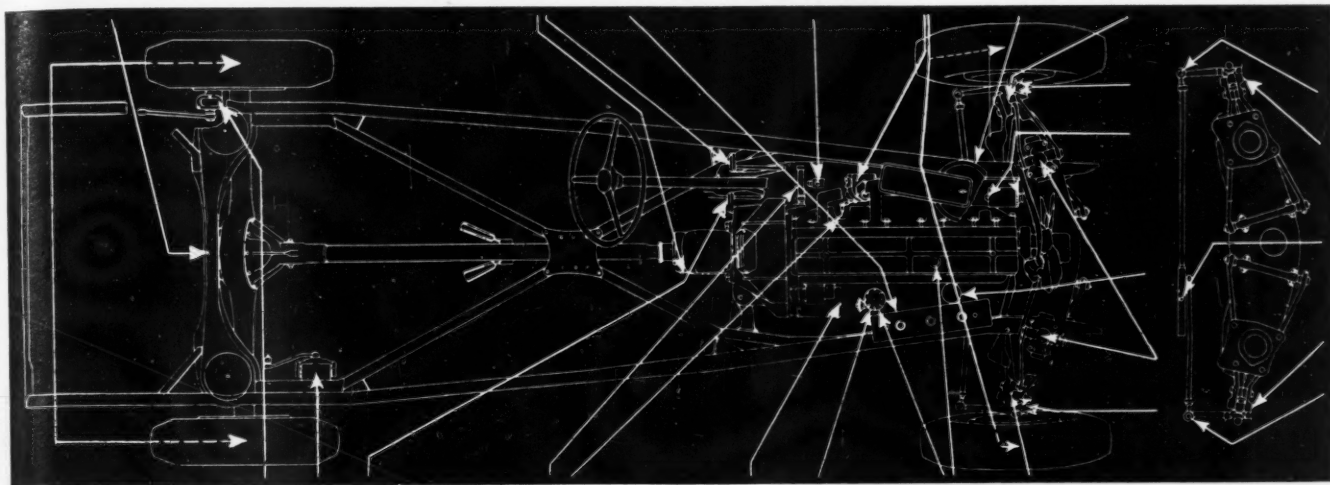
## CHECK THE ELECTRICAL SYSTEM

**An electrical tune-up will protect customers' cars against failure in service and thus "keep 'em rolling"**

The average shunt-wound generator of the modern car will show approximately 30 amperes output if it is charging properly. The voltage regulator is calibrated to hold the battery condition to from 6.0 to 6.5 volts. A check will reveal whether the generator or the regu-

lator is at fault, and corrections can then be made to prevent a recurrence of battery failure. Regulator and cutout relay points must be clean. Go over the wire connections from the generator to the regulator to be sure they are tight.

*(Continued on Page 75)*



# LUBRICATE

## FOR LONGER CAR LIFE

**L**UBRICATION is tremendously more important today than it was before Pearl Harbor. Last year, you had to give an owner an argument to get him to come in regularly. You could tell him that failure to lubricate his car regularly and properly was storing up big repair bills and shortening the car's life, but generally he did as he pleased about it.

Today all that has been changed. The owner knows as well as you do that, when his present car wears out, he isn't going to get a new one. He's not only willing—he's eager—to listen to any advice you can give him on prolonging the useful life of his present car, and, when it comes to lubrication, you have plenty to give him.

You can point out to him, for example, that lubrication these days must be complete. Back in the days when every owner lived in expectation of turning in his car in the spring, he could afford to take a chance on cut-rate lube jobs and on ignoring the advice of his serviceman. Such an attitude was penny-wise pound-foolish then; today it shouldn't be hard to convince owners that it's sheer folly.

Car engineers and lubrication ex-

**Owners now eager to learn how they can reduce wear by regular visits to your lifts for complete service**

perts have only one aim in recommending specific lubricants for certain points and in recommending renewal of these lubricants at certain intervals. That aim is to prevent wear of vital parts. For an owner to ignore these recommendations, particularly the periodic change of lubricant, is to invite untimely ruin for his car.

Owners have been pretty well schooled in the necessity of changing engine oil every 1000 miles or at most every 2000 miles, but few of them realize that here are such things as summer and winter lubricants. It's the serviceman's duty to acquaint them with the fact that transmission and differential should be drained and refilled with new lubricant every spring and fall. It's also worth pointing out to the owner that he can run into trouble if he tries to drive all year with

winter lubricant in his differential. This, being lighter, is likely to slip past the oil seals and reach the brake lining. That, of course, means new lining for the rear shoes.

Then there are the wheel bearings to tell the owner about every 5000 miles. Parts are not plentiful enough today to take a chance on damaging any if it can be so easily avoided. A 5000-mile interval is about right, too, for telling him that his shock-absorber fluid should be replenished.

Along about the same time, the owner will appreciate your telling him about cleaning the oil-bath air cleaner and replenishing the oil, if his car is so equipped, and about cleaning the fuel-pump screen. If the car has an oil filter, the cartridge should be renewed every 5000

*(Continued on Page 75)*

**E**VEN though they can't buy new cars, owners still want new-car appearance. And that desire opens up a field of service that was never cultivated to the limit under normal conditions.

Fender bumping, frame straightening and other body work of the kind have expanded greatly in the last few years, and body shops had trouble getting enough men to do the work even before war began. It is hard to say how volume will be affected by the war, because it depends to such a large extent on traffic conditions. In England, collisions between private cars and military vehicles sent body work soaring. It is certain, however, that strictly appearance jobs, such as painting, waxing, polishing, and upholstery work, can be increased materially in the next several months.

The reason is fairly obvious. Owners of new models are interested in maintaining what one car maker used to call "the pride of ownership." They not only want their cars to last as long as possible but to look like a new car. Owners of older cars are more aware than ever before of the importance of preserving the finish of their cars.

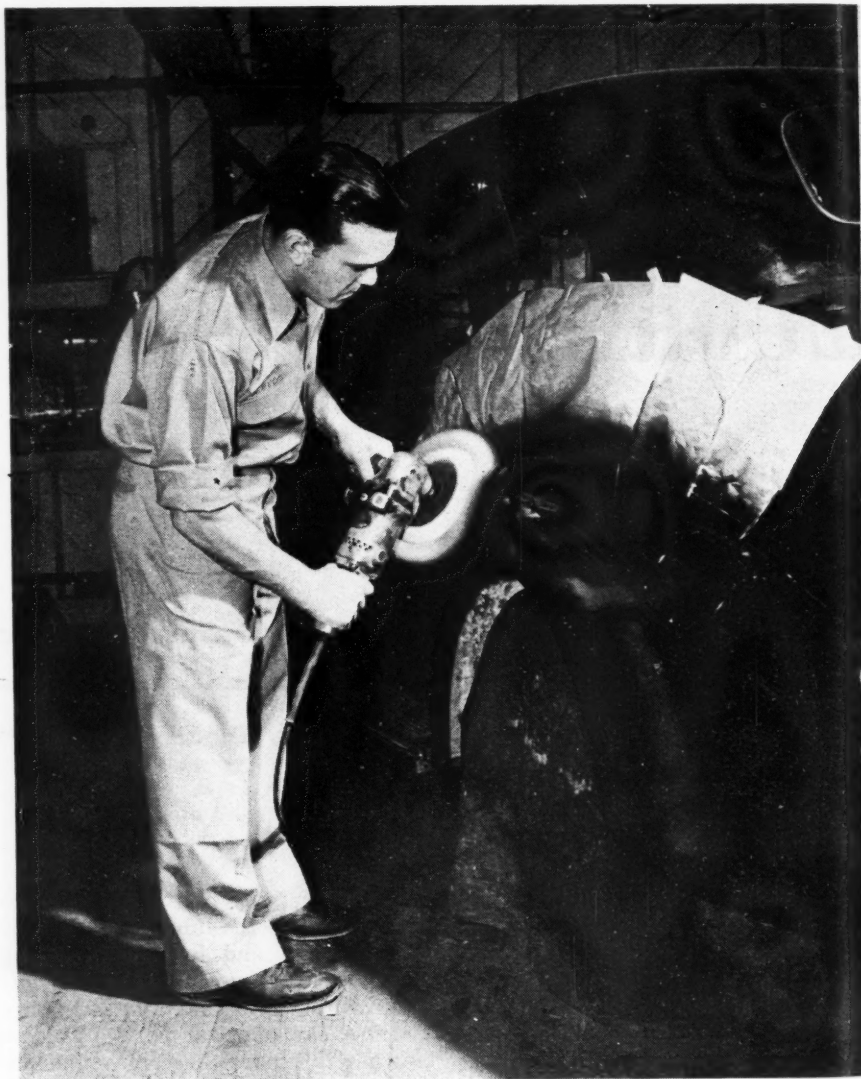
Waxing certainly is one appearance job owners will buy with increasing frequency, for waxing along with painting and polishing, is something a car must have at intervals, regardless of the mileage driven. Except for those who drove expensive cars, too many owners used to consider waxing more or less a luxury. Under present conditions, they need to be shown that it is a necessity. It is one thing to let grime and dust and grease have their way with a finish when the car has to be driven two or three years, but a more serious matter when the car must last—and look good—indefinitely.

Painting is a job smart owners will not put off a minute longer than necessary. If their cars have begun to look shabby, it will do

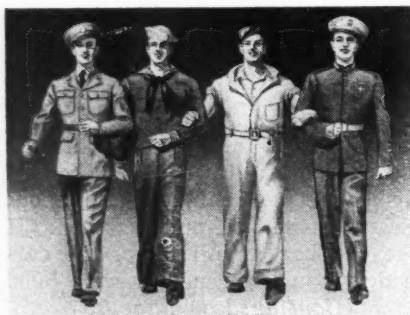
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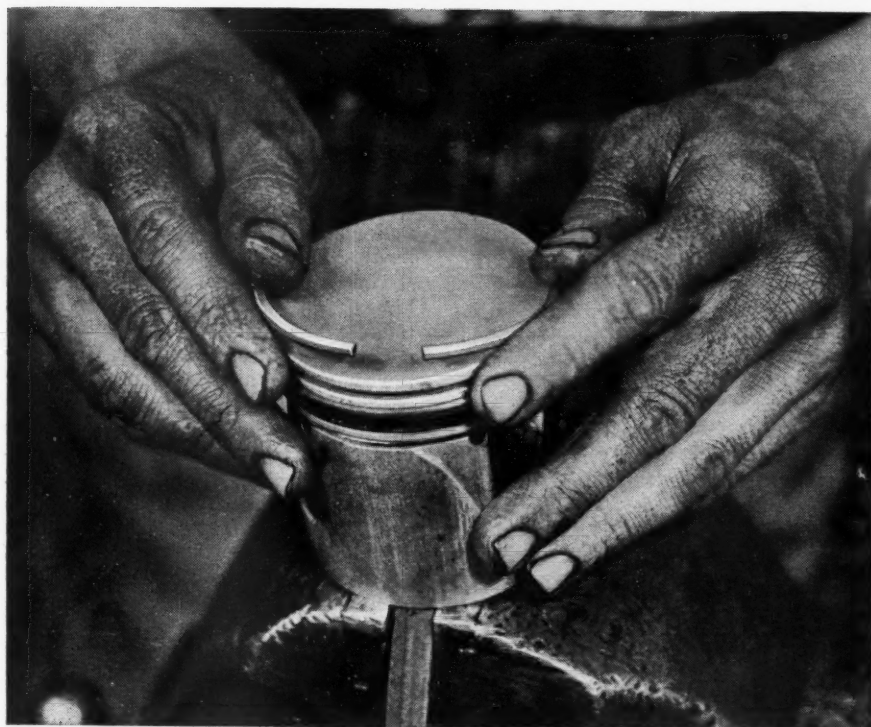
**KEEP 'EM NEW**

## **WITH BODY SERVICE**



**The desire of owners to preserve the looks of their cars creates a new demand for appearance jobs**





## WARTIME ECONOMY FROM

# COMPLETE TUNE-UP

**If our parts supply is to last and customers spared needless expense, wartime service must be thorough**

**S**ERVICING engines during the war period calls for a lot more skill and thought than it did during peace time, when parts and fuel were more plentiful and skilled labor was relatively easy to find.

Today, before a mechanic starts a job, he has to decide what repairs

are necessary to obtain maximum economy of operation with a minimum number of new parts. That's quite a job. The easy way is to install all new parts, but parts are getting scarcer, and it is the patriotic duty of every mechanic to prolong the life as much as possible

of all the parts that go to make up an automobile.

Before discarding any part, the mechanic must decide whether it can be repaired, its effect on the economy of operation, and, if the part is used again as is, whether it will last a reasonable number of miles.

This is brought out most forcibly when doing a tune-up job. The mechanic has to decide if compression is satisfactory; if not, will a valve grind be all that is required or will it be necessary to install rings? Then, when the valves are out, can they be refaced once more; will a complete set of new ones be required, or will it be necessary to replace only a few valves?

But in every instance a precision job must be done in order to get the most miles out of each gallon of fuel and each quart of oil, and, in order to do such a job of tune-up, the mechanic must remember that the fundamental requirement for the operation of an automobile engine is that the combustible mixture must be compressed. The more it is compressed, the greater the power derived from the fuel and, therefore, if any compression is lost, power is also lost and fewer miles will be obtained from each gallon of fuel.

It is, therefore, absolutely necessary to check the compression pressure before doing a tune-up job. If the pressure is more than 10 per cent below the specified amount, both rings and valves should be checked.

In this connection, it should be emphasized that a carbon and valve job in many instances results in increased oil consumption because of the higher manifold vacuum and, therefore, if the oil consumption prior to the compression check was approximately 250 miles per quart of oil for normal driving, it would in general be advisable to install a new set of rings or rings and pistons, depending on the condition of the cylinder walls. In the latter case it is, of course, also necessary to recondition the cylinder walls.

Too much care cannot be taken in tightening the bearing caps and cylinder heads. If factory specifications, as to tension as indicated by a torque wrench, are not followed, bearings and cylinders will be distorted, causing excessive friction. The distorted cylinder block will result in compression loss, missing, decreased power and increased fuel consumption. In connection with cylinder-head installation, it is ad-

*(Continued on Page 69)*



## CUTTING THE PATTERN TO FIT

**With parts getting scarce, today's  
serviceman can afford to use no  
more than the job actually demands**

**By ROSE LU GOLDMAN**

**T**HE old adage of "cutting the pattern to fit the cloth" held no more meaning for the pioneer women who first voiced it than it holds for the men of the automobile industry today. To our feminine ancestors, it was a verbal admission that the limited materials at hand controlled their styles and not distant dressmakers in fashionable Boston or far-off London.

The automotive serviceman finds himself in much the same position today when old styles of selling and methods of servicing—all based on the theory of an unlimited supply of goods—no longer fit the restrictions under which he must operate. The rubber shortage alone is keeping hundreds of cars off the road every day. Replacement parts, many of them made of "essential" metals, are more difficult to obtain. The industry must now cut its service and selling pattern to fit the limited supply of materials which it can obtain.

In the mental stress which always accompanies the re-evaluation of the place of an industry to a nation, and of an individual's relation to that industry, we must be careful not to lose sight of the fundamental problem. In the case of the automobile service industry, and of the individual serviceman, the fundamental problem is to keep as many cars rolling as possible.

This problem has not changed, and never will. Upon the ability of the industry to solve it depends much of the stability of our national well-being, both economically and socially.

Looking at it from the purely personal angle, every car that is forced off the road for the duration—no matter how slight the need—ceases to be a customer for anything. The problem of the service industry in war, as in peace, is to keep the cars rolling, for only when they run are they potential customers.

So the problem hasn't changed. What is and must change is our own philosophy on how the problem can be met. Our new answer, as we implied above, must keep in mind present limitations—things which this industry has never faced before.

Today we American women are learning that economy is the watchword of victory. We're being asked to save old papers, boxes, rags and scrap materials. We're learning that nourishment, not elaborateness, is the prime factor for meal-planning. This year we will buy fewer dresses with an eye more for wear than for whim—and those that we do buy will have less yardage—shorter and straighter skirts, sleeves and jackets.

Motorists too, are being taught to conserve—to save for victory. Now the industry, too, is finding that it must make some pretty drastic changes in its policies and plans. Because abundance was always taken for granted, there had developed an attitude of—not exactly carelessness, but

*(Continued on Page 84)*



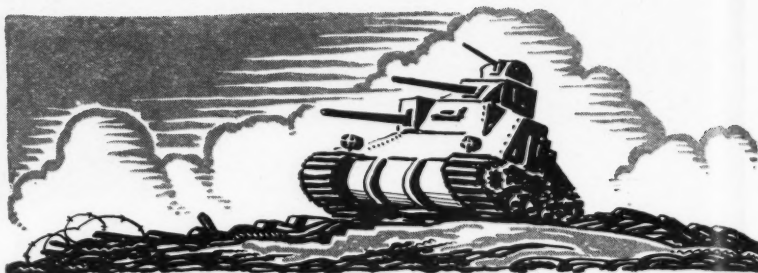
# **MOTOR AGE**

## **1942 SERVICE MANUAL**

**COMPILED BY BOB HANKINSON**

# BUICK 1942

## Series 40 and 50



### Engine

Eight cylinder, valve-in-head,  $3\frac{3}{8} \times 4\frac{1}{8}$  in. Displacement 248 cu. in. Maximum brake hp. 110 at 3400 r.p.m. for Series 40, and 118 at 3600 r.p.m. for Series 50. Compression ratio 6.0 to 1 with optional ratio of 6.3 to 1 for Series 40; 6.3 to 1 standard for Series 50. Compression pressure at cranking speed, 112 lbs. for Series 40, 115 lbs. for Series 50.

### Pistons

Cast iron. Removed from above. Fit in cylinder with .002 in. clearance on thrust side. Install with hollowed side of piston head toward camshaft side of engine.

### Connecting Rods

Removed from above. Bearing adjustment is by means of shims. Install in engine with oil spray hole toward camshaft side.

### Main Bearings

Adjusted by removing shims. Replacement bearings supplied in complete sets only.

### Operating Tappet Clearance

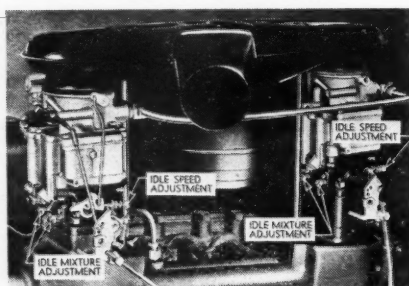
Run engine in shop at fast idle for 20 minutes, then set tappet clearance with .017 in. feeler gage, using .018 in. gage as "no go" check.

### Valve Timing

Valves are properly timed when marks on camshaft and crankshaft sprockets are in line with copper plated washers of timing chain. Washers are 10 links apart.

### Carburetor Adjustment

Adjusting procedure for single carburetor (Series 40) or for dual carburetors (Series 50) is the same: Back off throttle stop screws until throttles are fully closed (ends of adjusting screw should be set to barely contact thin section of cold idle cam on front carburetor and throttle body on rear carburetor when throttles are



fully closed). Turn each throttle adjusting screw "in" exactly  $\frac{3}{4}$  turn. Turn idle mixture adjusting screws "in" until they seat, and back out 1 full turn. Start engine; if further adjustment is necessary, turn each adjusting screw an equal amount.

### Steering Adjustment

Ball-bearing worm and nut type steering gear requires exact alignment in frame. When attempting steering gear adjustment, first disconnect steering tie rod from pitman arm; turn steering gear slowly from extreme left to extreme right. If stiffness occurs, loosen all bolts holding gear to frame bracket. One pivot hole and three slotted holes provide for vertical alignment, and sidewise alignment is obtained by rotating housing in mounting. Tighten gear to housing bolts when properly aligned. To adjust worm shaft play, first tighten housing end cover screws, then turn bearing adjuster until slight load is felt on steering wheel when turning near extreme positions.

To adjust backlash between ball nut and Pitman shaft gear, first tighten the three side cover screws, center the steering gear, loosen adjusting screw lock nut and turn adjusting screw in to tighten or reduce backlash, and out to increase lash. Tighten lock nut.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .015 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance      | .015 in.      |
| Ignition Timing      | 4 Deg. B.T.C. |
| Compression Pressure | 112 lbs.      |

### Flywheel Removal

Should it be necessary to remove the flywheel, the rear main bearing cap will have to be removed also.

### Manifold Gaskets

Intake manifold uses individual gasket at each leg, and pilot rings to align manifold with cylinder head intake ports. Exhaust manifold uses no gaskets between manifold and cylinder head, and no sealing compound is needed.

### Brake Adjustment

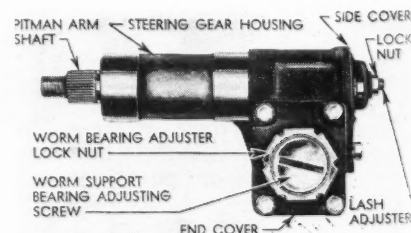
Expand brake shoes by turning notched adjusting wheel through opening in brake backing plate until wheel can just be turned over by hand. With both rear wheel brakes tight in this manner, tighten the adjusting nut at the end of the parking brake cable until all slack is removed from cables. Then back off notched adjusting wheel 15 notches or clicks at each wheel.

### Muffler Installation

When installing a new muffler be sure that the end with the stamp "Front" on the outer shell is installed toward the front of the car. Adjust suspension brackets to provide at least 1 in. clearance between muffler tail pipe and rear seat pin.

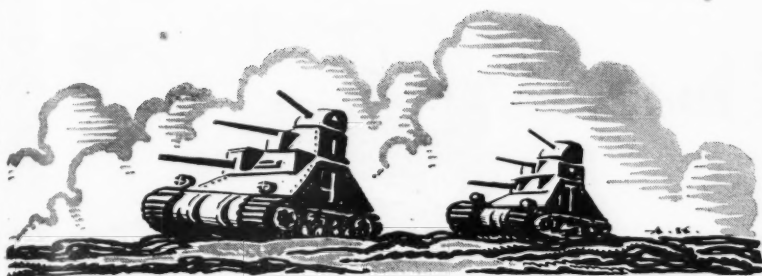
### Draining Cooling System

To completely drain the cooling system open the drain cock in the front side of the radiator bottom tank, and also remove the pipe plug in the right side of the engine at the rear.



### Tension Specifications (Foot-pounds)

Cylinder head nuts, 65 to 70; connecting rod nuts, 45 to 50; main bearing bolts, 120 to 130.



# 1942 BUICK

## Series 60, 70 and 90

### Engine

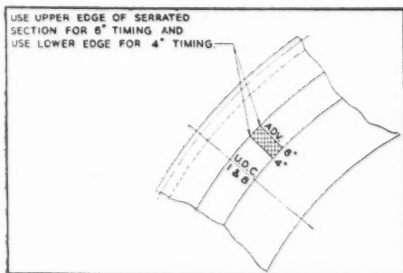
Eight-cylinder, valve-in-head,  $3\frac{1}{8} \times 4\frac{1}{8}$  in. Displacement 320.2 cu. in. Maximum brake hp. 165 at 3800 r.p.m. Compression ratio 6.7 to 1. Compression pressure at cranking speed, 115 lbs.

### Distributor

Delco-Remy, Model 1110801, centrifugal and vacuum advance. Breaker point gap .015 in. Breaker arm spring tension 19-23 oz. Cam angle 31 deg.

### Ignition Timing

Marks on flywheel, visible through opening in right side of housing. Spark occurs 6 deg. before top center.



### Spark Plugs

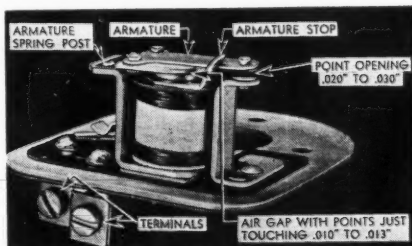
AC, type 46, 14 m/m. Gap .025 in. If difficult to obtain good engine idle, set gap to .030 in.

### Generator

Delco-Remy, Model 1102668, current and voltage control. Maximum output 32-34 amps at 8 volts. Cut-out relay points close between 6.2 and 6.7 volts, and open on discharge current of 0 to 4 amps.

### Current Regulator

Remove cover and install jumper wire between upper contact points and armature of voltage regulator unit (end unit opposite "F" terminal). Disconnect wire from "BAT" terminal and connect test ammeter leads between this wire and the terminal.



Start engine and increase speed to approximately 26 m.p.h. until output remains constant between 32 and 34 amps. If necessary to adjust, set air gap between center of core and armature to between .075 and .085 in. Adjust current setting by bending the lower spiral spring hanger down to increase current and up to decrease current. Remove jumper wire.

### Starting Motor

Operated through solenoid, mounted on starting motor. Contact made by accelerator pedal. Solenoid relay point gap .020 to .030 in. Air gap between armature and pole of magnet coil should be .014 to .018 in. with points just closed. Point gap adjusted by bending point gap adjustment stop. Spring tension adjusted by bending tension spring seat up or down. Points close between 1.3 and 1.6 volts; armature will strike core between 1.8 and 2.4 volts.

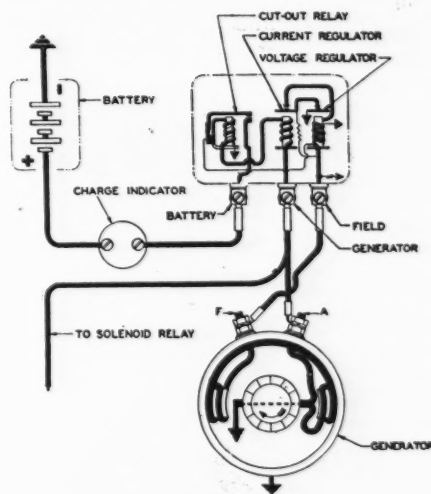
### Voltage Regulator

Disconnect wire from "BAT" terminal, and connect test ammeter leads between this wire and terminal. Connect voltmeter leads between "BAT" terminal and ground. Start engine and increase speed to approximately 26 m.p.h. and adjust resistance unit of test set to show 8 to 10 amps. charge. Run until regulator is hot to touch, and then drop speed down until cutout relay points open.

### TUNE-UP DATA

Breaker Point Gap . . . . .015 in.  
Spark Plug Gap . . . . .025 in.  
Valve Clearance . . . . .015 in.  
Ignition Timing . . . . .6 Deg. B.T.C.  
Compression Pressure . . . . .115 lbs.

Then increase speed and check voltage at which 8 to 10 amp charge is reached; should be 7.2 to 7.4 volts. If regulator adjustment is necessary, set air gap between center of core and armature at .067 to .073 in. with armature pushed down so that points are just separating. Voltage setting is adjusted by bending lower spring hanger down to increase voltage, and up to decrease.



### Brakes

Bendix or Delco hydraulic. Series 60 and 70: Drum diameter 12 in.; lining  $\frac{1}{8}$  in. thick x  $2\frac{1}{4}$  in. wide x  $22\frac{1}{8}$  in. length per wheel. Series 90: Drum diameter 14 in.; lining  $\frac{1}{4}$  in. thick x 2 in. wide x  $26\frac{1}{8}$  in. length per wheel.

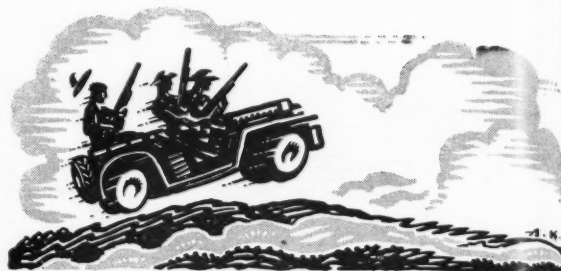
### Front Spring Installation

Upper end of spring pilots around cup which is attached to frame by shock absorber bolt. Be sure rubberized fabric spacer is between spring and frame. The lower end of the spring does not have a flat-ground coil, and it is important that the last coil be positioned in the recess provided for it in the spring seat. Special overload rear springs are available.

### Tension Specifications (Foot-pounds)

Cylinder head nuts, 65 to 70; connecting rod nuts, 45 to 50; main bearing bolts, 120 to 130.

# CADILLAC 1942

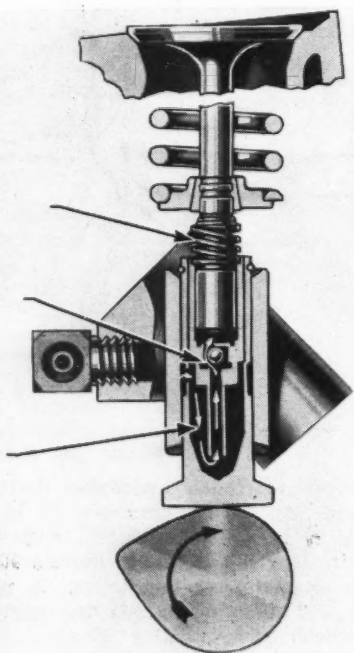


## Engine

Eight cylinder,  $3\frac{1}{2} \times 4\frac{1}{2}$  in. Displacement 346 cu. in. Maximum brake hp. 150 at 3400 r.p.m. Compression ratio 7.25 to 1. Compression pressure at cranking speed 100-105 lbs.

## Valve Lifters

Hydraulic. Should be disassembled and cleaned whenever removed from engine. Plunger spring should be locked into cylinder body with a twist of the plunger, and cylinder should



slide smoothly into lifter body when free of oil. When reinstalling, fill lifter body with oil and set silencer into body, being sure that silencer is being assembled into same lifter body from which it was removed. Install lifter brackets in engine, and apply engine oil to top of silencers. Before connecting oil feed pipe to lifter bracket, crank the engine several times to be sure all air is expelled from the pipe. Then connect feed pipe to lifter bracket.

## Valves

Necessary to remove valve lifter assemblies before removing valves. Clean valve cover plates carefully be-

fore removing, to prevent dirt from falling into valve lifter compartment.

## Pistons

Aluminum alloy, T-slot, cam ground. Remove from above. Install in engine with T-slot toward left side of engine, and fit with .0023 to .0025 in. clearance on T-slot side.

## Connecting Rods

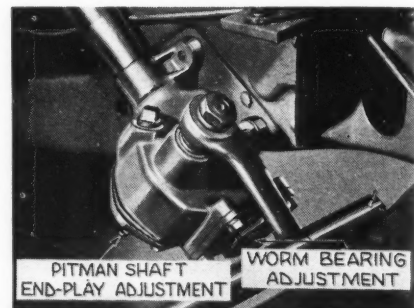
Remove from above. Bearings are steel-back babbitt, slip-in type. Install rods with numbered side toward bottom of engine.

## Front Wheel Alinement

Caster and camber angles are controlled by an eccentric pin in the upper end of the steering knuckle support arm just as in past models. Desired caster angle is negative  $1\frac{1}{4}$  to  $2\frac{1}{4}$  deg. Desired camber angle is negative  $\frac{1}{2}$  to positive  $\frac{1}{2}$  deg. Toe-in is obtained by turning the tie rod adjusters on the outer ends of each tie rod an equal amount to obtain  $\frac{1}{32}$  to  $\frac{3}{32}$  in.

## Steering Gear Adjustment

The recirculating ball-type steering gear has two adjustments, one for the steering tube worm bearing and the other for the Pitman shaft end play. To adjust worm shaft bearings, disconnect steering connecting rod from Pitman arm, and back off Pitman arm shaft end play adjusting screw. Loosen lock nut and turn adjusting screw in until a  $1\frac{1}{4}$ -lb. pull is required to turn steering wheel. Tighten lock nut. To adjust Pitman shaft end play, tighten thrust screw at head end of Pitman shaft until  $1\frac{1}{2}$  to 2-lb. pull is required to turn steering wheel through center



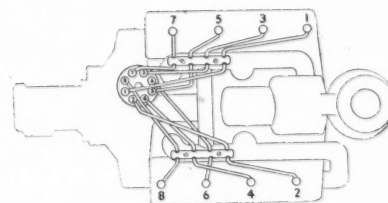
position. Tighten adjusting screw lock nut and reconnect steering connecting rod.

## Front Wheel Alinement

Caster and camber are adjusted by turning the eccentric threaded bolt in the upper control arm. Desired caster angle is negative  $1\frac{1}{4}$  to negative  $2\frac{1}{4}$  deg. Desired camber angle is positive  $\frac{1}{2}$  to negative  $\frac{1}{2}$  deg. When setting toe-in, first place the front wheels straight ahead, and then turn the tie rod adjusters on the outer ends of each tie rod an equal amount to obtain between  $\frac{1}{32}$  and  $\frac{3}{32}$  in. toe-in.

## Engine Idle Speed

Cars equipped with Hydra-Matic drive should have engine idle speed set at not more than 375 r.p.m. to prevent car from creeping forward when transmission shift lever is in driving position.



## Ignition Timing

Adjust breaker points to .015 in. gap, and shift distributor so that No. 1 cylinder (front cylinder of left bank) fires when IG/A mark on vibration damper lines up with pointer on timing gear housing cover.

## Tension Specifications (Foot-pounds)

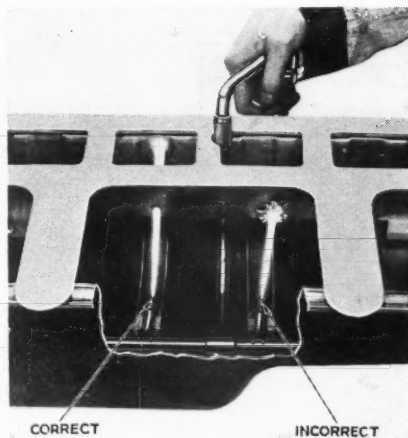
Cylinder head bolts, 70 to 75; connecting rod bolt nuts, 50 to 60; main bearing cap bolts, 140 to 150.

## TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .015 in.      |
| Spark Plug Gap       | .030 in.      |
| Valve Clearance      | Automatic     |
| Ignition Timing      | 5 Deg. B.T.C. |
| Compression Pressure | 100-105 lbs.  |



# 1942 CHEVROLET



## Engine

Six cylinder, valve-in-head,  $3\frac{1}{2} \times 3\frac{3}{4}$  in. Displacement 216.5 cu. in. Maximum brake hp., 90 at 3300 r.p.m.. Compression ratio 6.5 to 1. Compression pressure at cranking speed, 110 lb.

## Connecting Rods

Remove from above. Bearing is spun in rod, adjusted by removing shims. Install in engine with piston-pin clamp bolt toward camshaft side. Rods are stamped with number of cylinder in which they should be installed.

## Pistons

Alloy cast iron, slipper skirt. Install in engine with .002 in. clearance on thrust side. Remove from above.

## Main Bearings

Steel-back babbitt. Adjusted by removing shims. Fit with .002 in. shim on each side of bearing cap.

## Rod Bearing Lubrication

Bearings are lubricated by pressure oil stream from nozzles in oil pan. Nozzles should be aimed so that stream of oil will follow through center of trough and will strike opposite side of oil pan at or slightly below the gasket flange.

## Valve Rocker Arms

Rocker arms are offset to right and left, and are identified by numbers

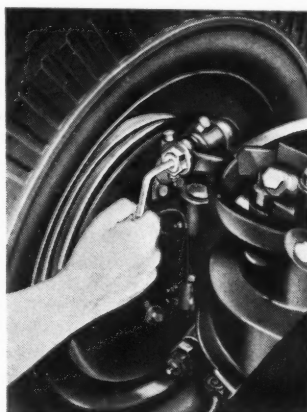
cast in the side: No. 1 exhaust is for cylinders 1, 3 and 5; No. 2 exhaust is for cylinders 2, 4 and 6; No. 5 intake is for cylinders 2, 4 and 6; No. 6 intake is for cylinders 1, 3 and 5.

## Ignition Timing

Set octane selector at zero, and adjust distributor so spark occurs in No. 1 cylinder when steel ball in fly-wheel lines up with pointer on flywheel housing.

## Front Wheel Alinement

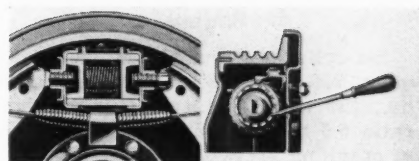
Caster and camber angles are adjusted by turning the eccentric pin in the upper control arm. Desired caster angle is zero, plus or minus  $\frac{1}{2}$  deg. Desired camber angle is  $\frac{1}{4}$  deg. Negative, plus or minus  $\frac{1}{2}$  deg.



Toe-in is adjusted by first setting the right wheel straight ahead and then loosening the clamp bolts at each end of the left hand tie rod and turning the rod to obtain the desired toe-in of 0-1/16 in.

## Brake Adjustment

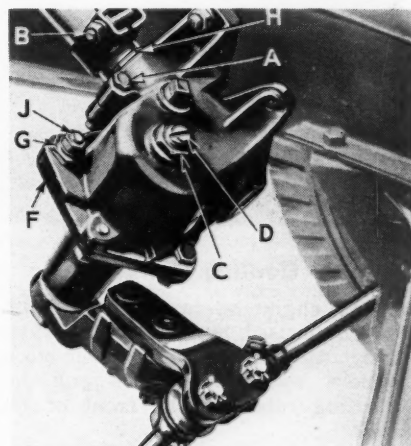
Disconnect emergency brake cables at the idler lever. Remove adjusting hole covers in brake backing plate



and insert screw driver through hole to engage teeth of wheel cylinder adjusting cover. Turn cover until brake has slight drag on drum, then back off four notches. Repeat at each adjusting cover at each wheel. Set hand brake in fully released position; install brake cable clevis plates to idler lever, and loosen cable check nuts. Then pull cables forward by hand until a positive stop is felt; tighten check nuts.

## Steering Gear Adjustment

To adjust wormshaft end play, loosen clamp bolt "B" and clamp bolt "A", and turn adjuster "H" clockwise. To adjust sector shaft, loosen lock nut "C" and tighten screw "D". To adjust backlash between worm and sector, loosen cover to housing bolts, and lock nut "J". With wrench on bolt "F" and sleeve "G", turn each in opposite directions slightly, just enough to remove backlash. Usually one-eighth of a turn is sufficient.



## Tension Specifications (Foot-pounds)

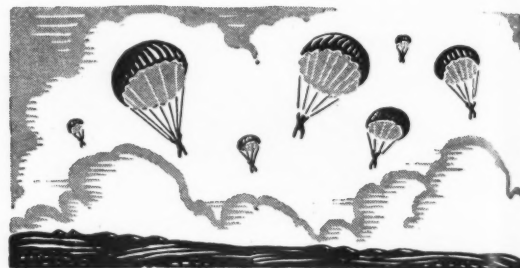
Cylinder head bolts, 75 to 80.

## TUNE-UP DATA

|                         |               |
|-------------------------|---------------|
| Breaker Point Gap....   | .018 in.      |
| Spark Plug Gap.....     | .040 in.      |
| Valve Clearance, In.... | .006 in.      |
| Ex.....                 | .013 in.      |
| Ignition Timing.....    | 3 Deg. B.T.C. |
| Compression Pressure .. | 110 lbs.      |

# CHRYSLER 1942

## Model C-34



### Engine

Six cylinder,  $3\frac{1}{8} \times 4\frac{1}{2}$  in. Displacement 250.6 cu. in. Maximum brake hp., 120 at 3800 r.p.m. Compression ratio 6.6 to 1. Compression pressure at cranking speed, 125 lbs.

### Pistons

Cast iron, cam ground, slotted skirt. Install in engine with slot away from valve side, and fit with .002 in. clearance on thrust side of piston. Remove from above.

### Connecting Rods

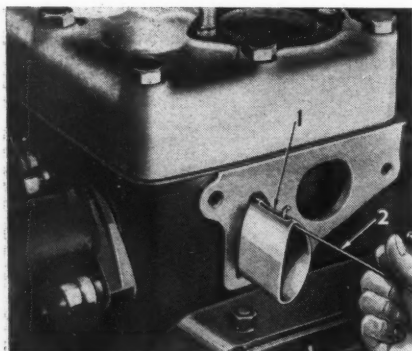
Bearings are steel-back babbitt, slip-in type, fitted to shaft with .001 to .0015 in. clearance. Install in engine with oil-spray hole toward valve side.

### Main Bearings

Steel-back babbitt, slip-in-type. Fitted with .001 to .0015 in. clearance.

### Front Bearing Cap Removal

To remove front main bearing cap, it is necessary to remove the two lower screws from the timing chain cover, which hold the front main bearing oil seal plate to the block.

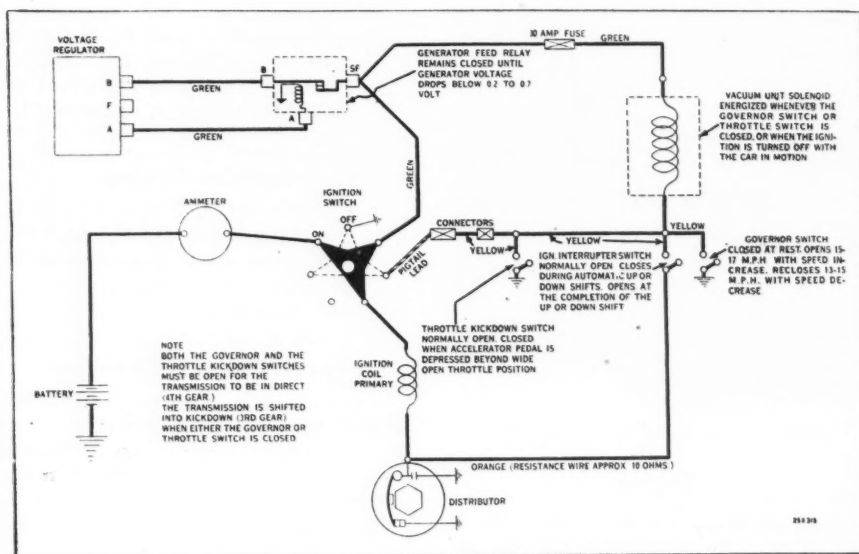


### Cooling System

High engine operating temperature may be caused by a worn-out water distributing tube in the cylinder block. Remove water pump and pull distributing tube out the front of the block.

### Operating Tappet Clearance

Intake valve tappets should be adjusted to .008 in. clearance, and exhaust valve tappets to .010 in., with engine at operating temperature.



### Ignition Timing

Adjust distributor so that spark occurs at 2 deg. after top dead center. Timing marks on vibration damper.

### Distributor

Centrifugal and vacuum advance. Breaker arm spring tension 16 to 19 oz. Cam angle  $34\frac{1}{2}$  to 38 deg. Breaker point gap .020 in.

### Fluid Drive

To fill the fluid-drive unit, remove the filler hole plate on the right side of the clutch housing. Turn the fluid drive unit until a filler plug hole stops opposite the hole in the clutch housing. Remove plug and fill unit with fluid drive oil until it runs out the bottom of the filler hole.

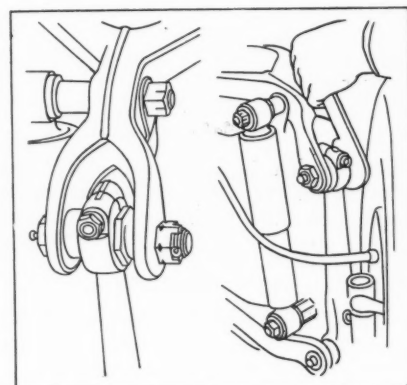
### Carburetor

Carter, Ball & Ball type. To check float level, remove bowl cover and

gasket and measure from top of bowl flange to top of float; should be  $\frac{1}{4}$  in.

### Front Wheel Alinement

Caster and camber controlled by threaded eccentric bushing in the upper control arm yoke. Caster angle



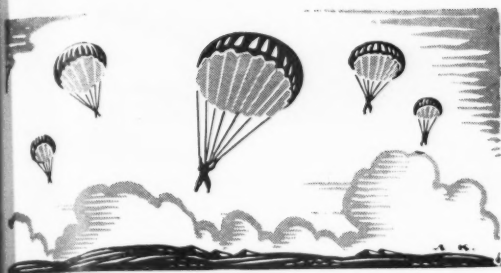
is plus 1 deg. to minus 1 deg. Camber angle zero to positive  $\frac{1}{4}$  deg. Toe-in should be zero to  $\frac{1}{8}$  in. To adjust toe-in, place front wheels straight ahead, and then turn each tie rod an equal amount to obtain desired toe-in.

### Tension Specifications (Foot-pounds)

Cylinder head bolts 65 to 70; connecting rod bolt nuts, 45 to 50; main bearing bolt nuts, 75 to 80; main bearing cap screws, 80 to 85.

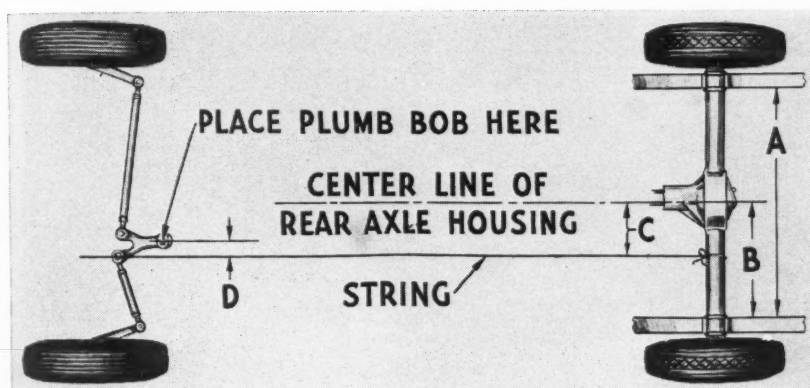
### TUNE-UP DATA

|                       |               |
|-----------------------|---------------|
| Breaker Point Gap     | .020 in.      |
| Spark Plug Gap        | .025 in.      |
| Tappet Clearance, In. | .008 in.      |
| Ex.                   | .010 in.      |
| Ignition Timing       | 2 Deg. A.T.C. |
| Compression Pressure  | 125 lbs.      |



# 1942 CHRYSLER

## Model C-36

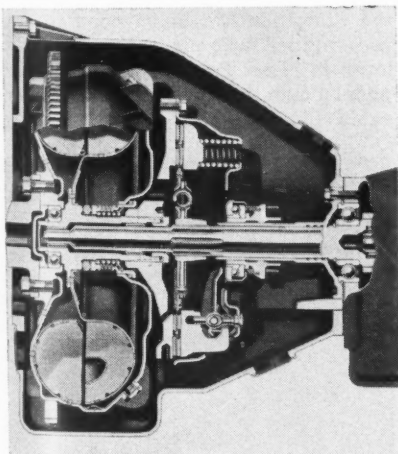


### Engine

Eight cylinder,  $3\frac{1}{4} \times 4\frac{1}{2}$  in. Displacement 323.5 cu. in. Maximum brake hp. 140 at 3600 r.p.m. Compression ratio 6.8 to 1. Compression pressure at cranking speed, 125 lbs.

### Pistons

Aluminum alloy, U-slot, cam ground. Install in engine with slot away from



camshaft side. Fit with .001 in. clearance on the thrust side. Remove from above.

### Carburetor

Stromberg, dual downdraft,  $1\frac{1}{4}$  in. Fuel level should be set level with the bottom of the inspection hole in the carburetor bowl. To prevent engine stalling when returned quickly to idle speed, cars with fluid drive are equipped with vacuum-operated throttle. Throttle control plunger should have .010 in. clearance at adjusting screws on lever on the cross shaft with engine at idle speed.

### Vacumatic Transmission Removal

Remove floor boards, disconnect speedometer cable, remove wires from vacuum unit solenoid, the interrupter switch and governor switch. Remove hose between vacuum unit air cleaner and vacuum unit, and disconnect hose in vacuum line between vacuum unit and engine manifold. Disconnect vacuum unit pullout cable and return spring, remove pivot pin and take out vacuum unit. Disconnect hand-brake cable at brake band. Disconnect propeller shaft at front universal and push yoke back. Disconnect gearshift control rod and selector cable. Remove nuts and lockwashers holding transmission to clutch housing, and pull transmission back and lower it to floor.

### Front Wheel Alinement

Caster and camber angles are controlled by eccentric bushing threaded to steering knuckle support arm upper pivot pin. Desired caster angle is negative 1 deg. to positive 1 deg. Desired camber angle is zero to positive  $\frac{3}{4}$  deg. Toe-in is obtained by turning both tie rods an equal amount to obtain zero to  $\frac{1}{16}$  in. toe-in.

### TUNE-UP DATA

|                         |               |
|-------------------------|---------------|
| Breaker Point Gap....   | .018 in.      |
| Spark Plug Gap.....     | .025 in.      |
| Tappet Clearance, in. . | .008 in.      |
| Ex. .                   | .010 in.      |
| Ignition Timing .....   | 2 Deg. A.T.C. |
| Compression Pressure..  | 125 lbs.      |

### Toe-In Adjustment

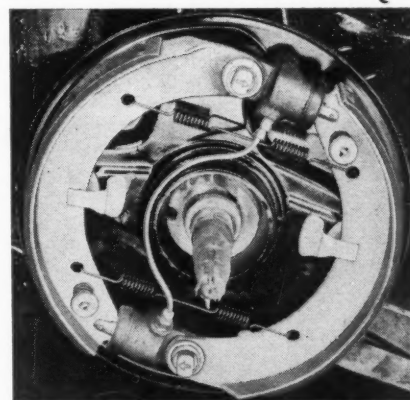
To obtain desired toe-in of zero to  $\frac{1}{16}$  in., first place front wheels in straight ahead position. Then turn each tie rod an equal amount.

### Main Bearings

Slip-in type. Puller required to remove front and rear main bearing caps. These caps have rubber oil seals placed in grooves between sides of bearing caps and block. New seals should be installed when caps are removed.

### Brakes

Lockheed hydraulic, conventional design on rear wheels, and two-cylinder design on front wheels. Adjusting procedure on rear wheels follows standard method; front shoes also have eccentric cams for making minor adjustment, and are operated in same manner. For major adjustment of front brakes, arrows on heads of anchor pins should point toward



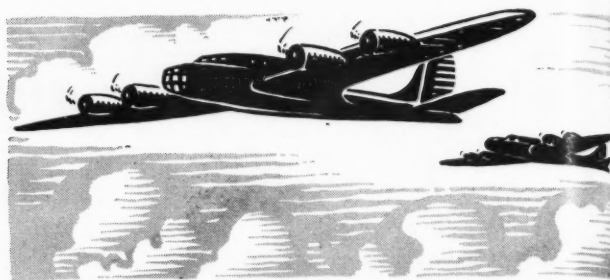
nearest wheel cylinder. Both anchors on left wheel should be turned toward front of car, and anchors on right wheel should be turned toward rear of car. Adjust to obtain .006 in. clearance between lining and drum at heel of each shoe, and for .007 in. clearance at toe end.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 65 to 70; Connecting rod bolt nuts, 45 to 50; main bearing stud nuts, 75 to 80, and main bearing cap screws, 80 to 85.

# DE SOTO 1942

## Model S-10



### Engine

Six cylinder,  $3\frac{1}{8} \times 4\frac{1}{2}$  in. Displacement 236.6 cu. in. Maximum brake hp., 115 at 3800 r.p.m. Compression ratio 6.6 to 1. Compression pressure at cranking speed, 125 lbs.

### Pistons

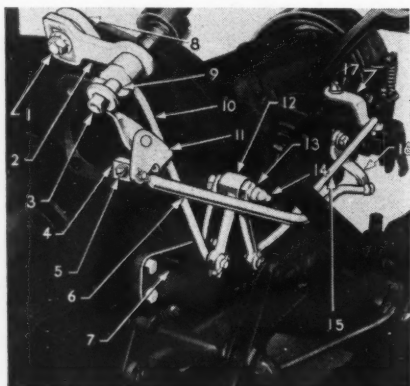
Lightweight cast iron, cam ground, full skirt. Fit in cylinder so that 10 to 15 lb. pull is required to withdraw .0015 in. feeler gage from between thrust side of piston and cylinder wall. Remove from above.

### Piston Rings

Two  $\frac{3}{8}$  in. compression rings, and two  $\frac{1}{2}$  in. oil rings above the pin. Fit with .007 in. to .015 in. gap.

### Gear Shift Adjustment

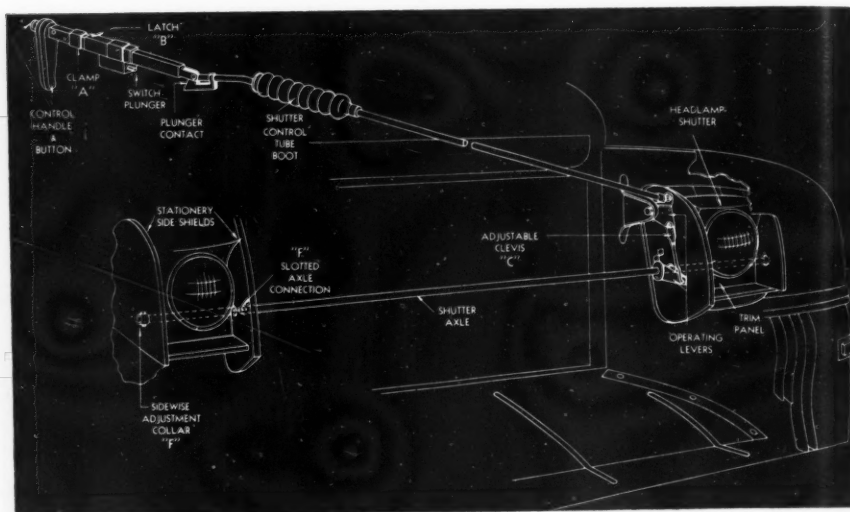
Loosen stud nut (1) on the upper lever at the lower end of the steering column. Check to see that the gear shift lever at the steering wheel is in neutral position and that the gears in the transmission are in neutral, then tighten the lock bolt. To adjust the gear selector, place transmission



gears in neutral, loosen lock nut (5) on selector rod (6), tighten adjusting nut to remove all play from rod, back it off one-half turn and then tighten lock nut.

### Aiming the Headlights

Pull out the control handle to open the shutters and turn on the lights. Remove four screws holding the trim plate, which will uncover the adjusting screws. Screw at the bottom is



for up-and-down adjustment; screw on right side of light is for side-to-side adjustment.

### Connecting Rods

Bearings are steel-back babbitt, slip-in type. Install in engine with oil spray hole toward camshaft side. Remove from above.

### Main Bearing Removal

To remove the front main bearing cap, it is necessary to take out the two lower screws in the timing gear case cover so the oil pan front end oil seal plate can be removed.

### Brakes

The seven-passenger sedan is equipped with front brakes having two wheel cylinder pistons. See Chrysler for adjusting instructions. Conventional models have Lockheed hydraulic brakes of standard design.

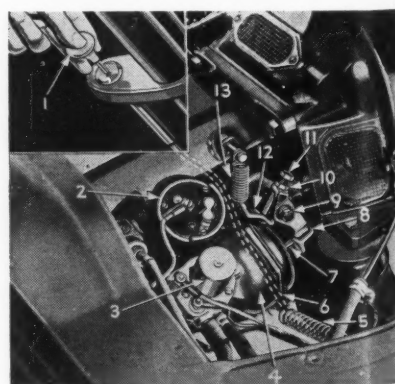
### Toe-In Adjustment

To obtain desired toe-in of zero to  $1/16$  in., first place front wheels in

straight ahead position. Then turn each tie rod an equal amount.

### Towing to Start Engine

When towing a car equipped with the Simplimatic transmission to start the engine, first place the gear shift lever in "Low Range," hold the clutch pedal down and pull out the lock-out cable (1) and hold it out. Turn on



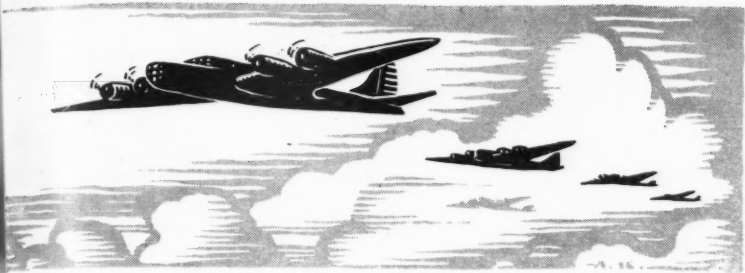
the ignition switch. When the car reaches about 10 m.p.h., engage the clutch. As soon as the engine starts, release the lock-out cable so it can return to its normal position.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .020 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance, In. | .008 in.      |
| Ex.                  | .010 in.      |
| Ignition Timing      | 4 Deg. A.T.C. |
| Compression Pressure | 125 lbs.      |

### Tension Specifications (Foot-pounds)

Cylinder head cap screws, 65 to 70; connecting rod bolt nuts, 45 to 50; main bearing stud nuts, 75 to 80; cap screws 80 to 85.



# 1942 DODGE

## Model D-22

### Engine

Six cylinder,  $3\frac{1}{4} \times 4\frac{5}{8}$  in. Displacement 230.2 cu. in. Maximum brake hp., 105 at 3600 r.p.m. Compression ratio 6.7 to 1 Compression pressure at cranking speed, 125 lbs.

### Front Main Bearing Removal

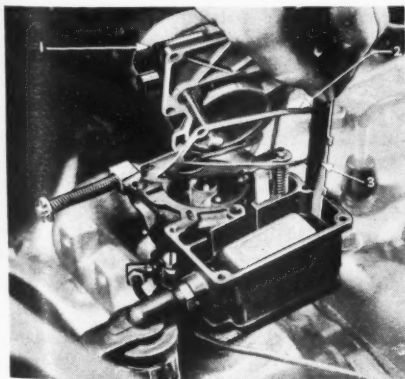
Necessary to remove oil pan front end oil seal plate by removing two lower screws from timing case cover. Oil seal plate is made of plastic, and when reinstalled do not tighten screws more than 15 ft. lbs. torque.

### Piston Rings

When installing compression rings, the step cut on the inner diameter of the ring should be toward the top of the piston.

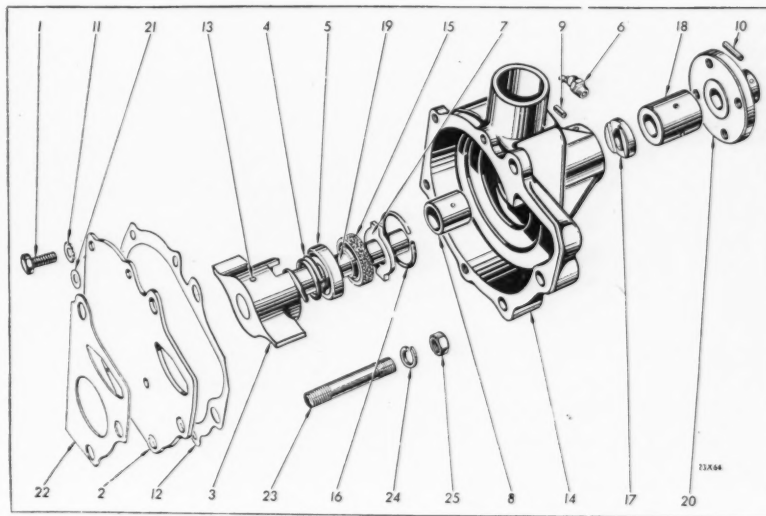
### Connecting Rods

Bearings are steel-back babbitt, slip-in type. Rods should be installed in engine with short side of off-set bearing toward front in Cylinders 1, 3 and 5 and toward the rear in Cylinders 2, 4 and 6; oil spray hole should be toward camshaft side of engine.



### Carburetor

Stromberg, Model BXV-3 for cars without fluid drive, and Model BXVD-3 for cars with fluid drive. To check fuel level, remove air horn and gasket, and measure from top edge of bowl to fuel; distance should be  $\frac{5}{8}$  in.



### Ignition Timing

Adjust distributor so that ignition occurs 2 deg. or .002 in. piston travel After Top Center. Timing marks on vibration damper.

### Brakes

Lockheed hydraulic. To adjust for lining wear, turn eccentric adjuster toward wheel rim until shoe drags on drum, then back it off until wheel turns freely. Repeat at each shoe and at each wheel.

### Generator

Current and voltage regulator control. Maximum output 35 amperes at 8 volts, at approximately 25 m.p.h. Cutout relay points close at 6.6 to 6.9 volts.

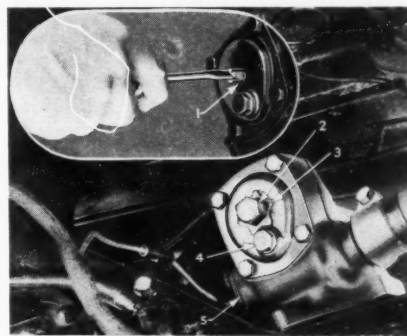
### Toe-In Adjustment

Place front wheels exactly straight ahead, and then turn both tie rods an equal amount to obtain zero to  $\frac{1}{16}$  in. toe-in. Be sure clamp bolt on left

end of the long tie rod is beneath the rod so as to prevent interference on extreme turns.

### Steering Gear

To adjust up-and-down play in steering tube, remove end cover from steering gear housing and remove shims. To adjust backlash between worm and roller, locate steering wheel in straight ahead position. Remove the roller tooth shaft adjustment screw lock nut (2), slide the lock plate (3) up enough to clear the lock boss on the roller tooth shaft cover,



and tighten the adjusting screw just enough to eliminate backlash. Slide lock plate back into position and re-install adjusting screw lock nut.

### TUNE-UP DATA

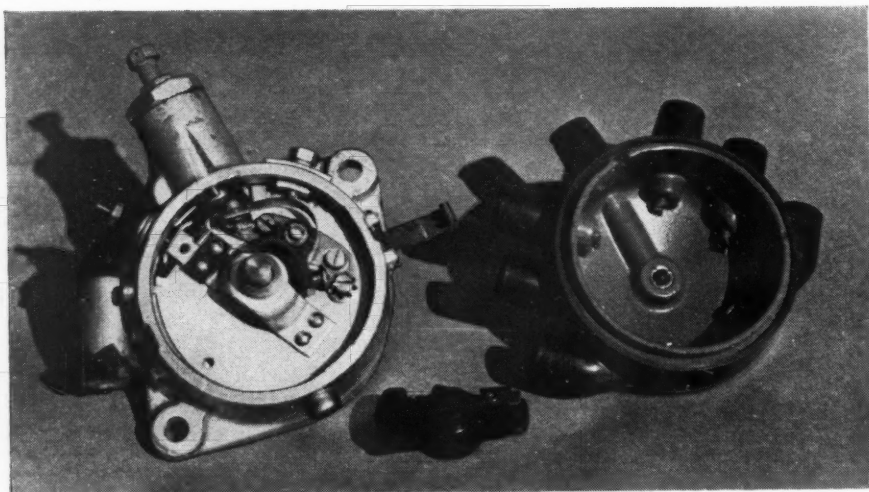
|                      |           |               |
|----------------------|-----------|---------------|
| Breaker Point Gap    | . . . . . | .020 in.      |
| Spark Plug Gap       | . . . . . | .025 in.      |
| Valve Clearance, In. | . . . . . | .008 in.      |
| Ex.                  | . . . . . | .010 in.      |
| Ignition Timing      | . . . . . | 2 Deg. A.T.C. |
| Compression Pressure | . . . . . | 125 lbs.      |

### Tension Specifications (Foot-pounds)

Cylinder head cap screws, 65 to 70; connecting rod bolt nuts, 45 to 50; main bearing cap nuts, 75 to 80.

# FORD 1942

## Six



### Engine

Six cylinder, 3.30 x 4.40 in. Displacement 226 cu. in. Maximum brake hp., 90 at 3300 r.p.m. Compression ratio 6.7 to 1. Compression pressure at cranking speed 117 lbs. Firing order 1-5-3-6-2-4.

### Pistons

Lightweight cast alloy iron. Remove from above. Fit with .0025 in. clearance in cylinder.

### Piston Pins

Float in rod and piston, retained in piston by lock rings. Fit in piston with .0005 in. clearance; in rod with .0001 in. clearance.

### Piston Rings

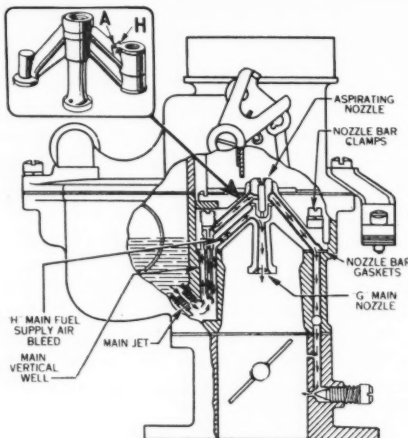
Two compression rings, .0915 to .0920 in. wide; one oil ring, expander type, .186 to .1865 in. wide. Fitted with .012 to .017 in. gap.

### Carburetor

Single, downdraft. Idle adjusting screw controls gas—turn in for lean mixture, out for rich. Place accelerating pump link in center hole for normal operation.

### Valve Tappets

Operating tappet clearance .013 to .015 in. Clearance obtained by grinding ends of valve stems. Remove from



cylinder block as an assembly consisting of valve, valve guide and spring.

### Ignition Timing

Single breaker distributor, mounted on front of engine. Set breaker point gap .014 to .016 in. Timing marks on side of distributor housing. Loosen adjusting screw and shift scale so mark on housing is in center of scale; move screw up to advance and down to retard timing. Adjust vacuum

### TUNE-UP DATA

Breaker Point Gap . . . . .014 to .016 in.  
Spark Plug Gap . . . . .030 to .034 in.  
Ignition Timing . . . . .2 Deg. B.T.C.  
Valve Clearance . . . . .013 to .015 in.  
Compression Pressure . . . . .117 lbs.

brake to just eliminate ping on quick acceleration.

### Valve Timing

With intake valve tappet clearance at .015 in., intake valve opens 3 deg. B.T.C. Valves are in time when punch marks on crankshaft and camshaft gears are together and in line with shaft centers.

### Brake Adjustment

Turn front shoe cam outward until lining drags on drum, then back it off until wheel revolves freely. Turn rear shoe cam outward until lining drags, then back it off until wheel revolves freely. Repeat at each adjusting cam at each wheel.

### Rear Axle

When installing new pinion shaft bearing cup, it is necessary to heat the neck of the differential housing before driving the bearing cup in place. Backlash between ring and pinion is adjusted by gaskets between the axle shaft housing and the differential housing. Backlash should be not less than .003 in. or more than .008 in.

### Front Wheel Alinement

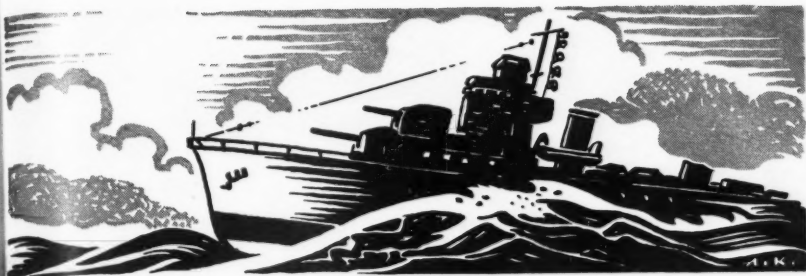
Caster angle, 8 deg.; camber angle, 1 deg.; toe-in 1/8 in.

### Gear Shift Adjustment

The remote control gear shift mechanism can be adjusted to correct shifting difficulties by first disconnecting the shifter rods at the transmission operating levers. Place operating levers in neutral at the transmission, and gear shift control lever at steering wheel also in neutral. With control lever in this position, operating levers at the bottom of the steering column should be in line with each other. Adjust shifter rods so pins will enter holes without moving levers.

### FORD 4-CYLINDER TUNE-UP DATA

Breaker Point Gap . . . . .014 to .016 in.  
Spark Plug Gap . . . . .025 in.  
Ignition Timing . . . . .Top Center  
Valve Clearance In. . . . .010 to .012 in.  
Ex. . . . .014 to .016 in.  
Compression Pressure . . . . .103 lbs.



# 1942 FORD

## V-Eight

### Engine

Eight cylinder, 3.062 x 3.75 in. Displacement 221 cu. in. Maximum brake hp., 90 at 3800 r.p.m. Compression ratio, 6.2 to 1. Compression pressure at cranking speed, 113 lbs.

### Pistons

Remove from above. Fit with .0025 in. clearance.

### Connecting Rods

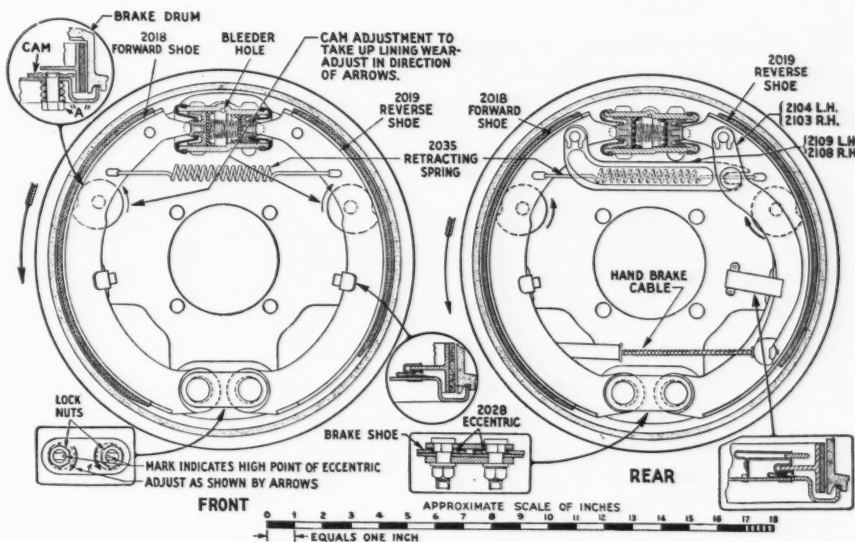
Remove from above. Rods and caps are marked with number of cylinder in which they are installed. When replacing in engine, install rod with numbered side toward outside of engine.

### Ignition Timing

Breaker point gap, .014 to .016 in. Set timing adjusting screw on distributor housing with mark in center of scale, and adjust vacuum brake with just enough tension to eliminate ping on quick acceleration.

### Transmission Removal

Remove screws holding front seat track to floor, and move seat back; remove floor pan; remove two upper uni-



and lower rear axle to floor, pulling it back enough to disconnect drive shaft from transmission. Remove jack and place it under engine oil pan. Remove universal joint cap screw and remove joint. Remove floor pan spacer. Remove eight capscrews holding transmission to engine, pull transmission back and up to remove from car.

adjust hand brake, place lever in fully released position. Push foot brake pedal down just enough to hold rear brake shoes firmly against drums. Loosen lock nut on hand brake rod and adjust turn buckle up to take out all slack in brake cables.

### Carburetor

Idle adjusting screws control fuel—turn out for rich, in for lean. Set fuel level  $\frac{1}{8}$  in.

### Front Wheel Alinement

Desired caster angle, 8 deg. Camber angle, 1 deg. Toe-in,  $\frac{1}{8}$  in.

### Steering Gear Adjustment

Set steering wheel in straight ahead position. To adjust roller shaft end play remove lock nut and lock plate from adjusting screw at inner end of Pitman arm shaft. Turn roller shaft adjusting screw just enough to eliminate shaft end play. Replace lock plate and nut, being sure that lock plate is in locked position against cover.

To remove up-and-down play in steering shaft, disconnect drag link, turn wheel to straight ahead position. Loosen end plate at bottom of housing, and remove one shim at a time from between end plate and housing, removing only enough to eliminate play.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 50.

### Battery Gage

Battery gage indicates state of charge of battery. Red section covers charge from zero to 6.2 volts; orange, from 6.2 to 7.1 volts; green, from 7.1 to 8.25 volts; small red section, above 8.25 volts.

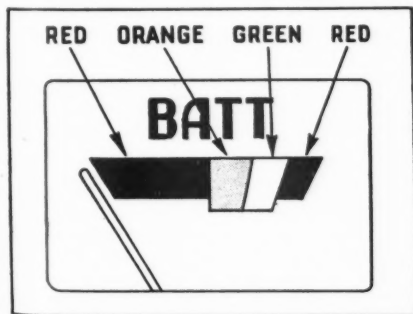
### Brake Adjustment

Turn adjusting cam of forward shoe out until shoe is tight against the drum, then back it off until wheel turns freely. Repeat adjustment at rear shoe. Repeat front and rear shoe adjustment at each wheel. Brake pedal should have from  $\frac{1}{4}$  to  $\frac{1}{2}$  in. free travel before brakes are applied. Adjust length of pedal rod at master cylinder to obtain this free travel. To

### TUNE-UP DATA

Breaker Point Gap... .014 to .016 in.  
Spark Plug Gap... .025 in.  
Ignition Timing... 4 Deg. B.T.C.  
Valve Clearance, In. .0115 to .0135 in.  
Ex. .015 to .017 in.  
Compression Pressure... 113 lbs.

PAGE NO. 4



versal joint cap screws and nuts from rear engine mounting bolts; disconnect speedometer cable, remove engine-to-frame mounting bolts and the two lower universal joint cap bolts. Then remove bolts holding the two halves of the ball cap, and lift out the upper half. Disconnect gear shift operating rods, clutch shaft extension and release arm rod. Raise rear end of car, disconnect hand-brake cable at equalizer and hydraulic brake line at torque tube. Place jack under rear axle and disconnect shock absorber links. Remove spring-to-frame "U" bolt nuts

# HUDSON 1942

## Model 20



### Engine

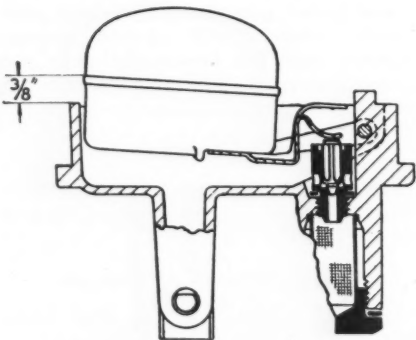
Six-cylinder, 3 x 4½ in. Displacement 175 cu. in. Maximum brake hp., 92 at 4000 r.p.m. Compression ratio 7.25 to 1. Compression pressure at cranking speed, 125 lbs.

### Pistons

Remove from above. Cam ground, T-slot. Install in cylinder with T-slot away from camshaft side, and fit with .0015 in. clearance on thrust side of piston.

### Carburetor

Carter, Model WA1-524-S. Float level ⅜ in., measured from projection on float bowl cover to top of seam in float, with cover and float assembly inverted.



### Valve Tappet Clearance

Operating tappet clearance—intake, .010 in., exhaust, .012 in.

### Piston Rings

Two ⅜ in. compression rings and one ⅜ in. oil ring above the pin, and one ⅜ in. oil ring below the pin. Rings are pinned in piston to prevent rotation.

### Connecting Rods

Remove from above. Bearing end is offset on rod. Install long side of bearing toward rear of engine in cylinders Nos. 1, 2 and 4 and toward front of engine in cylinders Nos. 3, 5 and 6. Bearing is spun in rod, and is not adjustable. Replace rod.

### Main Bearings

Held in crankcase and bearing caps by machine screws. Not adjustable. Necessary to use puller to remove front and rear main bearing caps.

### Distributor

Auto-Lite Model IGW-4203-A, centrifugal and vacuum advance. Breaker arm spring tension 18 to 20 oz. Point gap .020 in. Cam angle 34 deg.

### Brakes

Bendix hydraulic on 4 wheels, with mechanical override on rear wheels only. Brake drum diameter, 10 in. Brake lining of primary shoe, molded; secondary shoe, woven. Lining size, 1¼ x ⅞ x 19⅝ in. per wheel.

### Valve Timing

Intake valve opens 27 deg. 50 min. or approximately 10 flywheel teeth before top dead center. Valves are properly timed when punch-marked tooth of crankshaft gear meshes between two punch-marked teeth of camshaft gear.

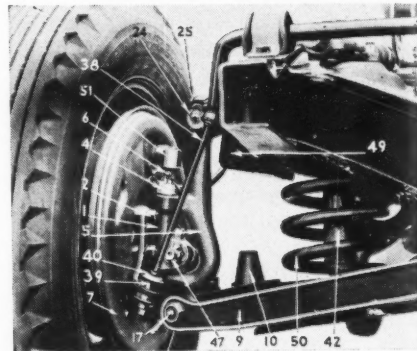
### Ignition Timing

Timing marks on flywheel. Adjust distributor so that No. 1 cylinder fires when the second short mark to the right of the long mark on the flywheel lines up with the pointer on flywheel housing.

### Front Suspension

Independent, coil spring. Caster and camber are adjusted by means of an eccentric bushing on the upper support arm. Caster angle, zero deg.,

plus or minus ¼ deg. Camber angle, ¼ to ¾ deg. Toe-in is obtained by adjusting both tie rods an equal amount to obtain total toe-in of 0 to ⅛ in.



### Clutch

Operates in oil, and has cork inserts pressed into the driven plate. Oil should be changed every 5,000 miles. To drain and refill, turn engine over until drain plug in flywheel is visible through the timing inspection hole in the left side of the flywheel housing, near the starter. Remove this plug. Then turn the engine over slowly until the star on the flywheel is in line with the pointer on the timing inspection hole. This places the drain hole at the bottom, so the oil can drain out. Then turn the engine over until the drain hole is again visible through the timing inspection hole, and refill clutch with 1/3 pint of Hudsonite clutch compound. Replace plug.

### Rear Axle Gear Adjustment

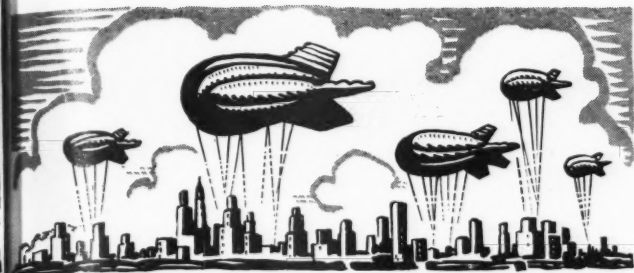
Depth of the pinion gear in relation to ring gear controlled by shims placed between front face of pinion gear and rear face of pinion shaft rear bearing cone. Bearing adjustment of front and rear pinion shaft bearings is controlled by shims placed between the bearing spacer and the front bearing inner cone. Draw companion flange on pinion shaft until shaft can just be turned with one hand.

### Tension Specifications (Foot-pounds)

Cylinder head nuts, 40; connecting rod bolt nut, 40; main bearing nuts, 75.

### TUNE-UP DATA

|                              |          |
|------------------------------|----------|
| Breaker Point Gap.....       | .020 in. |
| Spark Plug Gap .....         | .038 in. |
| Valve Clearance, In.....     | .010 in. |
| Ex.....                      | .012 in. |
| Ignition Timing              |          |
| 1/2 in. on flywheel B.T.D.C. |          |
| Compression Pressure.....    | 124 lbs. |

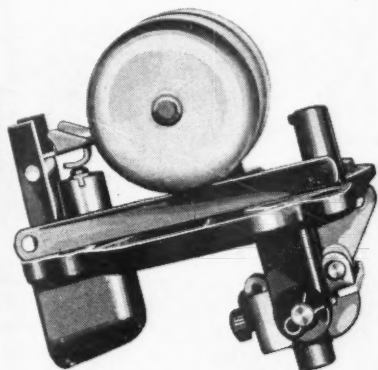


# 1942 HUDSON

## Models 24, 25 and 27

### Engine

Eight-cylinder, 3 x 4½ in. Displacement 254 cu. in. Maximum brake hp. 128 at 4200 r.p.m. Compression ratio 6.5 to 1. Compression pressure at cranking speed 119 lbs.



### Carburetor

Carter, Model WDO-502-S. To set float level, invert bowl cover and float assembly and adjust to allow ⅛ in. clearance between bowl cover and each end of float.

### Pistons

Aluminum alloy, T-slot, cam ground. Removed from above or below. Install in engine with T-slot away from camshaft, and fit with .0015 in. clearance on thrust side.

### Piston Pins

Full-floating. Fit in piston bosses and in connecting rod bushing with .0003 in. clearance, or push fit with heel of the hand. To check fit, hold piston in horizontal position, and rod should just turn on pin under its own weight.

### Valves

Seat angle 45 deg. Operating tappet clearance, intake .006 in., exhaust .008 in. hot. Intake valve opens 10 2/3 deg. B.T.D.C. or approximately 3½ flywheel teeth.

### Spark Plugs

Hudson-Champion J-9, 14 mm. Point gap .032 to .045 in.

### Ignition Timing

Ignition occurs at top center. Adjust distributor so that No. 1 cylinder fires when long mark on flywheel is under pointer on flywheel housing.

### Distributor

Auto-Lite Model IGP-4008-A, centrifugal and vacuum advance. Cam angle 30½ deg. Breaker arm spring tension 18 to 20 oz. Breaker point gap .017 in.

### Oil Pressure Light

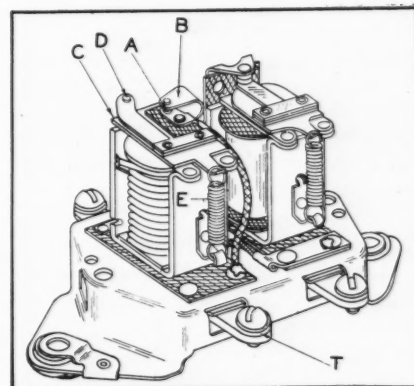
Oil pressure indicator light should light when ignition is turned on, and should go out when normal pressure is developed with engine running. If the lamp does not light, ground the check valve terminal to the engine. If the lamp does not light, replace the bulb. If the lamp does light, remove the terminal pin and see that it is straight and clean. Take off the plug on top of the check valve housing, remove the plunger and see that it is clean and moves freely up and down. Examine the spring above the plunger. Pressure required, with oil hot, to light the lamp ranges from 4 to 12 pounds.

### Generator

Auto-Lite, Model GEC-4801-A, third brush adjustment with voltage regulator control. To test output, install jumper wire from "F" regulator terminal to ground. Disconnect wire at "BAT" terminal of regulator, and connect positive ammeter lead to this wire, negative lead to "BAT" terminal. Connect negative voltmeter lead to "BAT" terminal, positive lead to ground. Run engine for 15 minutes at 20 m.p.h. to warm up, then increase speed to approximately 35 m.p.h. With no resistance, generator output should be 34 amperes at 8 volts. If not, adjust third brush to this setting.

### TUNE-UP DATA

|                            |          |
|----------------------------|----------|
| Breaker Point Gap.....     | .017 in. |
| Spark Plug Gap.....        | .038 in. |
| Valve Clearance, In. ....  | .006 in. |
| Ex. ....                   | .008 in. |
| Ignition Timing .....      | T.C.     |
| Compression Pressure ..... | 119 lbs. |

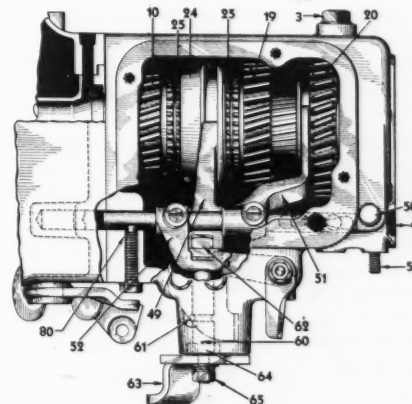


### Transmission Removal

To remove transmission, it is necessary to remove the two engine rear mounting bolts and jack up the rear end of the engine about ½ in. off the frame.

### Handy Shift Adjustment

Check cross shift by lifting knob of gear shift lever toward rim of steering wheel; this will force selector lever on transmission toward rear, placing inner end of operating lever in low and reverse shifter fork notch. Adjust cable length to correspond to this position. Adjust gear selector rod at steering tube end to make oper-



ating lever straight down when in neutral position.

### Tension Specifications (Foot-pounds)

Cylinder head nuts, 40; connecting rod bolt nut, 40; main bearing nuts, 75.

# LINCOLN 1942

## Zephyr

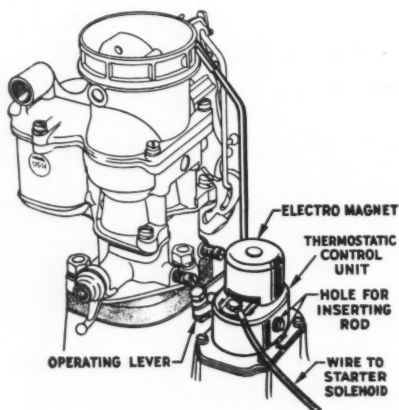


### Engine

Twelve cylinder, V-type, 2.93 x 3.75 in. Displacement 306 cu. in. Maximum brake hp. 130 at 3800 r.p.m. Compression ratio 7 to 1. Compression pressure at cranking speed, 125 lbs.

### Automatic Choke

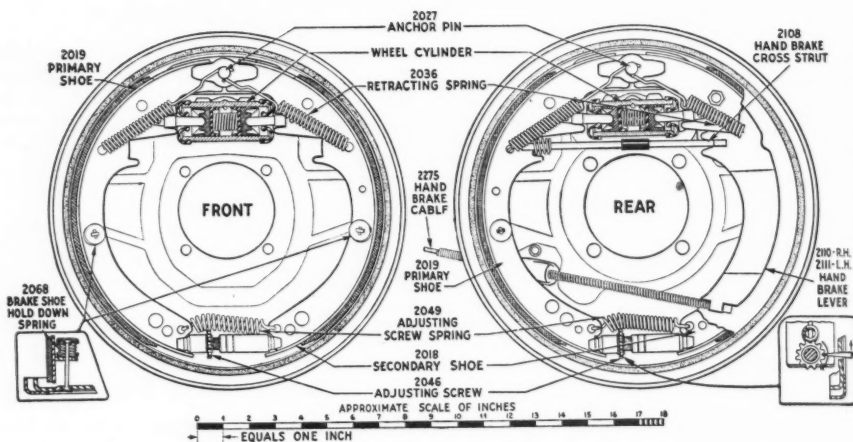
An electric automatic choke, combining an electric magnetic solenoid and a thermostatic spring, operates the carburetor choke valve. Solenoid is energized when starter is operated, drawing the armature lever down to close the choke valve. After the engine starts, the solenoid becomes inoperative, and further movement of the choke valve is controlled by the thermostatic spring, which loses its



tension as it gets warm, permitting the choke to open. To adjust, move the lever until hole in the brass shaft lines up with slot in bearing, and then insert a 5/64 in. rod through the hole to hold the lever in this position. Loosen the clamp screw on the lever and push the lever upward until the choke valve closes tight against a .010 in. feeler. Tighten clamp screw and remove rod from shaft hole.

### Valves

Automatically adjusting hydraulic lifters. When valves are removed for refacing, lifters should be removed, the oil washed out, and the parts inspected. Take care not to mix plungers, as each is a selective fit in that particular lifter body. When reassem-



bling, all parts should be dry. Check clearance between end of valve stem and top of plunger, with plunger and plunger spring fully compressed. This clearance should be not less than .030 in., or more than .070 in. If less than .030 in., grind end of valve stem.

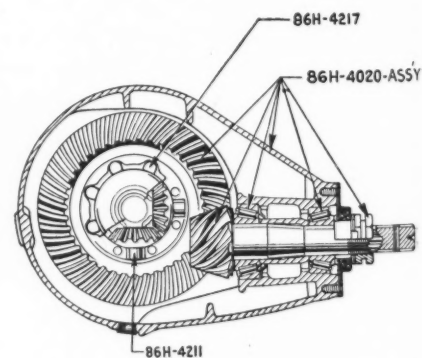
### Brakes

Self-energizing, two-shoe, hydraulic operation. Brake lining 1.74 in. wide, x .210 in. thick x 23.9 in. per wheel. Primary shoe uses molded lining, secondary shoe uses woven lining. For minor adjustment, turn eccentric adjuster in direction of forward wheel rotation until secondary shoe drags on drum, then back it off until wheel is free. Expand the notched adjusting wheel between the shoes until the wheel can just be turned over by hand; then back it off, counting the number of clicks until the wheel is free. Repeat both operations at each wheel, being careful to back off the notched adjusting wheel the same number of clicks for each wheel.

### Rear Axle

When it is necessary to replace the ring gear and pinion of the hypoid

axle, the pinion gear and bearings are supplied already assembled in the differential housing. A ring gear to mate properly with the pinion is also included in the exchange. The ring gear is marked with figures to indicate the clearance between ring and pinion. This clearance is obtained by use of proper thickness gaskets on each side of the differential housing. If the gear



is marked for .002 to .004 in. clearance, use a .005 and an .008 in. gasket on each side of the housing. Pinion is properly adjusted for depth when assembled in the housing, and should not be changed when installing the new set.

### Front Wheel Alinement

Desired caster angle 3 to 5 deg. Camber angle 1 deg. Toe-in 1/8 in.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 50.

### TUNE-UP DATA

Breaker Point Gap... .014 to 0.16 in.  
Spark Plug Gap.... .028 to .030 in.  
Ignition Timing .... 4 Deg. B.T.C.  
Valve Clearance .... Automatic  
Compression Pressure. 125 lbs.



# 1942 MERCURY

## Engine

Eight cylinder, V-type, 3.187x3.75 in. Displacement 239 cu. in. Maximum brake hp., 100 at 3800 r.p.m. Compression ratio 6.4 to 1 Compression pressure at cranking speed, 120 lbs.

## Pistons

Lightweight alloy cast steel. Remove from above. Fit in cylinder with .003 in. clearance.

## Piston Rings

Two compression rings and one oil ring. Gap .012 to .017 in.

## Valves

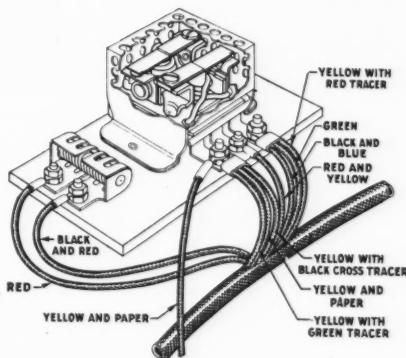
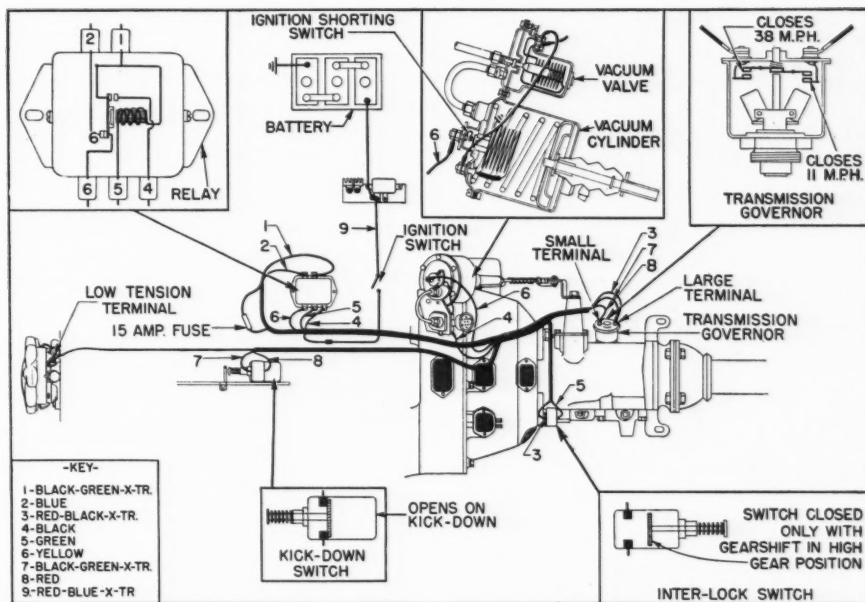
Operating tappet clearance, intake .010 to .012 in.; exhaust, .014 to .016 in. Intake valve opens at Top Center. Valves are in time when marks on crankshaft and camshaft gears are together and in line with shaft centers.

## Liquamatic Drive

The liquamatic drive consists of a fluid flywheel and an automatic transmission. Fluid clutch uses S.A.E. 10-W oil, and should be filled to the bottom of the filler hole when the hole is centered between two marks at the opening in the left side of the flywheel housing. Gear shift is accomplished by means of a series of solenoids and a vacuum cylinder, controlled by a governor mounted on the right side of the transmission.

## Brakes

Molded lining on primary and secondary shoes. Lining width 1.74 in.; thickness .20 in.; length per wheel 23.4 in. Each shoe is provided with cam adjuster. Turn adjuster out until lining drags on drum, then back it off until wheel rotates freely. Eccentric anchor for each shoe provides for centralizing shoe within the drum. When newly lined shoes are installed, anchors should be positioned so that the marks on the ends of the bolts are together. Each anchor should then be adjusted to move the mark downward toward the rim of the backing plate. Move the anchor downward until the lining drags on the drum, then back it off until the wheel rotates freely. Then perform the



With this system, a short in the accessory circuits will not affect the lights.

## Front Wheel Alinement

Desired caster angle, 3 to 5 deg. Camber angle, 1 deg. Toe-in 1/8 in.

## Generator

Two-brush type, with current and voltage regulator. Maximum output 32 amperes at 6 volts.

## Piston Pins

Float in rod and piston, retained in piston by lock rings. Fit in piston with .0005 in clearance; in rod with .001 in. clearance.

## Rear Axle

When installing new pinion shaft bearing cup, it is necessary to heat the neck of the differential housing before driving the bearing cup into place. Backlash between ring and pinion is adjusted by gaskets between the axle shaft housing and the differential housing. Backlash should be not less than .003 in. or more than .008 in.

## Circuit Breaker

The lighting system circuit breaker consists of two magnetic and thermostatic units in a single case. One circuit breaker handles the headlight current and the other the current for the various electrical accessories.

## TUNE-UP DATA

|                         |                  |
|-------------------------|------------------|
| Breaker Point Gap...    | .014 to .016 in. |
| Spark Plug Gap.....     | .025 in.         |
| Ignition Timing .....   | 4 Deg. B.T.C.    |
| Valve Clearance, In.... | .010 to .012 in. |
| Ex. ....                | .014 to .016 in. |
| Compression Pressure.   | 120 lbs.         |

## Tension Specifications (Foot-pounds)

Cylinder head bolts, 50.

# NASH 1942

## Model 4240



### Engine

Six-cylinder,  $3\frac{1}{8} \times 3\frac{1}{4}$  in. Displacement 172.6 cu. in. Maximum brake hp. 75 at 3600 r.p.m. Compression ratio 6.87 to 1. Compression pressure at cranking speed, 120 lbs.

### Pistons

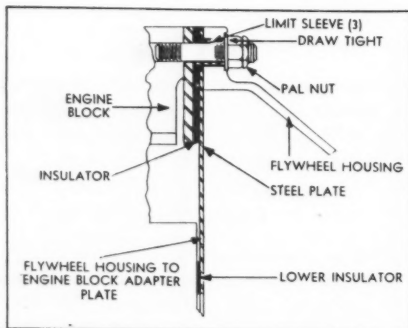
Cast iron, cam ground. Fit in cylinder with .0003 to .0009 in. clearance. Remove from above.

### Valve Timing

Intake valve opens 19 deg. before top dead center. No valve timing marks on flywheel, but valve timing point can be marked on vibration damper by measuring  $1\frac{9}{16}$  in. ahead of the top dead center mark, and placing a mark at that point. If timing-gear case cover is off, 19 deg. before top center can be checked by checking number of links of timing chain between punch marks on crankshaft and camshaft gears. Should be  $9\frac{1}{2}$  links or 19 pins.

### Main Bearings

Steel-back babbitt, slip-in type. Replaced without removing crankshaft from engine. Fit to .002 in. clearance.

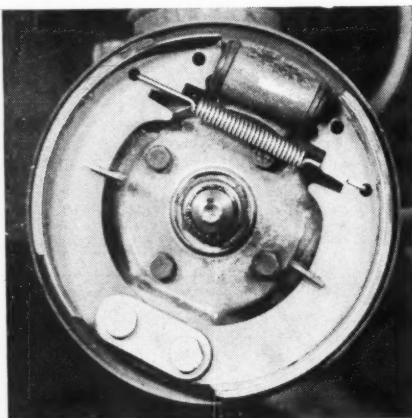


### Flywheel Housing Mounting

Between flywheel housing and rear of engine is a steel plate and a rubber insulating pad. If flywheel housing is removed, it is important that new rubber insulators be installed to maintain proper alignment of flywheel housing with engine.

### Brakes

Bendix, two-shoe, double anchor, hydraulic. To adjust for lining wear, turn eccentric cam outward until shoe drags on drum, then back it off until wheel turns freely; repeat at each shoe and at each wheel. Adjust brake-pedal clearance to allow approximately  $\frac{1}{2}$  in. free travel before piston in master cylinder starts to move.



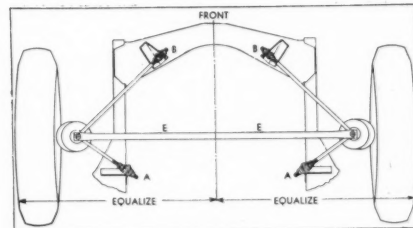
### Connecting Rods

Drilled for forced lubrication to the piston pin. Install in engine with oil-spray hole toward right side of engine. Bearings are steel back babbitt, slip-in type. Remove from above.

### Front Wheel Alinement

Caster angle is checked against the steering knuckle pin roller sleeve, just above the steering knuckle. Desired angle is 0 deg., plus or minus  $\frac{1}{4}$  deg. Caster angle is increased by loosening nut "B" and tightening nut "A".

Camber angle is adjusted by loosening nuts "B" and "A" on both sides of the car, and then tightening nuts "B" and "A" on one side to obtain de-



sired angle on that side. An increase in camber angle on one wheel decreases the camber angle on the opposite wheel, because the two are connected by the support bar "E". Nuts "B" and "A", and their lock nuts, must be tight when the job is finished. Desired camber angle is 0 to  $\frac{1}{2}$  deg.

Toe-in is adjusted by turning each tie rod adjusting tube an equal amount to obtain 0 to  $\frac{1}{16}$  in. toe-in from straight ahead position.

### Rear Axle Removal

Raise and support the rear end of the body. Disconnect rear wheel brake cables at the center equalizer. Disconnect the torque tube at the transmission and the rear axle stabilizer bar at the axle. Remove brake tube connections. Disconnect shock absorbers and springs from the rear axle, permitting them to hang suspended from the body. Be careful not to bend shock absorber rod or bayonet. Disconnect the torque tube and brace rods.

### Carburetor

Carter, BBRI, Model 513S,  $1\frac{1}{4}$  in. downdraft. Idle adjusting screw controls gas—turn out for rich mixture, in for lean. Standard setting  $\frac{1}{2}$  to  $1\frac{1}{4}$  turns open. To set float level, remove bowl cover and air horn assembly, and measure from top edge of bowl to top of float. Should be  $\frac{5}{64}$  in. Set accelerating pump rod in inner hole for summer operation.

### Ignition Timing

Adjust distributor so that No. 1 cylinder fires at top center, or when mark on vibration damper lines up with pointer on timing gear cover.

### Tension Specifications (Foot-pounds)

Cylinder head, 61-64; connecting rod bolt nuts, 27 to 30; main bearing cap bolts, 66 to 70.

### TUNE-UP DATA

|                      |          |
|----------------------|----------|
| Breaker Point Gap    | .020 in. |
| Spark Plug Gap       | .025 in. |
| Valve Clearance      | .015 in. |
| Ignition Timing      | T.C.     |
| Compression Pressure | 120 lbs. |



# 1942 NASH

## Model 4280

### Engine

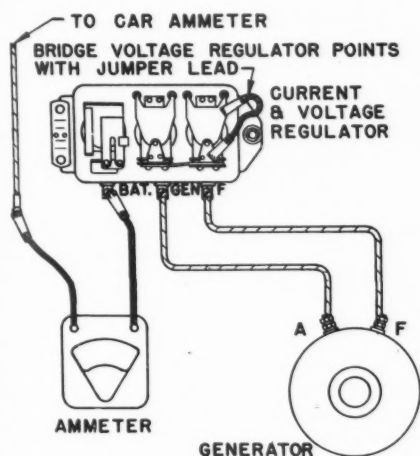
Eight-cylinder, valve-in-head,  $3\frac{1}{8} \times 4\frac{1}{4}$  in. Displacement 260.8 cu. in. Maximum brake hp., 115 at 3400 r.p.m. Compression ratio 6.6 to 1. Compression pressure at cranking speed, 110 lbs.

### Pistons

Aluminum alloy, split-skirt, cam ground. Install in cylinders with .0025 in. clearance on thrust side, and with split skirt toward left side of engine. Remove from above.

### Connecting Rods

Rifle-drilled to provide forced lubrication to piston pin. Install in engine with oil-spray hole toward right side. Bearings are steel-back babbitt, slip-in type.

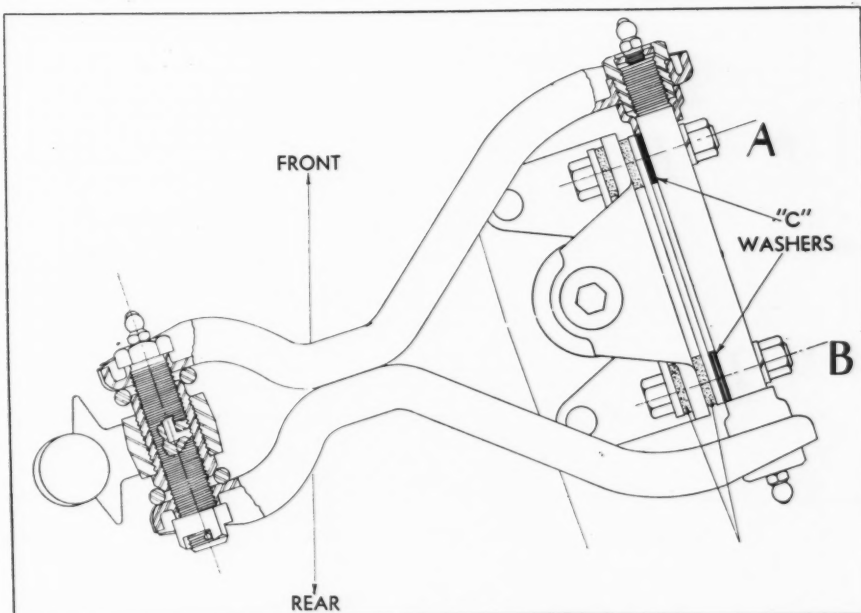


### Valve Timing

Intake valve opens  $10\frac{1}{2}$  deg. before top center. To check, mark the vibration damper at a point  $\frac{7}{16}$  in. ahead of the top dead center mark to indicate intake valve opening point. When checking valve timing by the timing chain, there should be 10 links or 20 pins between the punch marks on the crankshaft and camshaft gears.

### Ignition Timing

Set breaker point gap at .017 in. Adjust distributor so ignition occurs 7 deg. before top dead center, as indicated by timing mark on vibration damper.



### Carburetor

Carter, Model WDO-538-S, dual, down draft, 1 in. Float level is  $\frac{3}{16}$  in. between machined surface of bowl cover and float, with assembly inverted. Turn idle adjusting screws out for rich mixture, in for lean.

### Generator

Shunt-type, two-brush, with current and voltage regulator control. Maximum output 34 amps. To check output, connect jumper wire to voltage regulator armature and to frame; disconnect wire from "BAT" terminal of regulator and connect positive ammeter lead to this wire; connect negative ammeter lead to "BAT" terminal. Turn on lights, radio and other accessories to prevent high voltage, and increase engine speed until output is steady. If necessary to adjust regulator, first set armature air gap to .080 in., then increase or decrease tension of springs by bending spring lower hangers up or down.

### Brakes

Bendix hydraulic. For minor adjustment, turn notched adjusting wheel through opening in backing plate until wheel can just be turned by hand, then back it off approximately 14 notches. Adjust brake pedal to allow  $\frac{1}{2}$  in. free travel measured at pedal pad.

### Front Wheel Alignment

Caster and camber are adjusted by adding or removing "C" washers between the upper control arm inner pivot bar and the frame brackets to which it is bolted. To increase caster angle, add "C" washer to bolt "B"; to decrease caster, add "C" washer to bolt "A". To increase camber, remove same number of "C" washers from each bolt "A" and "B"; to decrease camber, add same number of "C" washers to each bolt. Desired caster angle is zero to minus  $\frac{1}{2}$  deg. Desired camber angle is  $\frac{1}{4}$  to  $\frac{3}{4}$  deg. Toe-in is adjusted by turning each tie rod adjusting tube an equal amount to obtain  $\frac{1}{32}$  to  $\frac{3}{32}$  in.

### TUNE-UP DATA

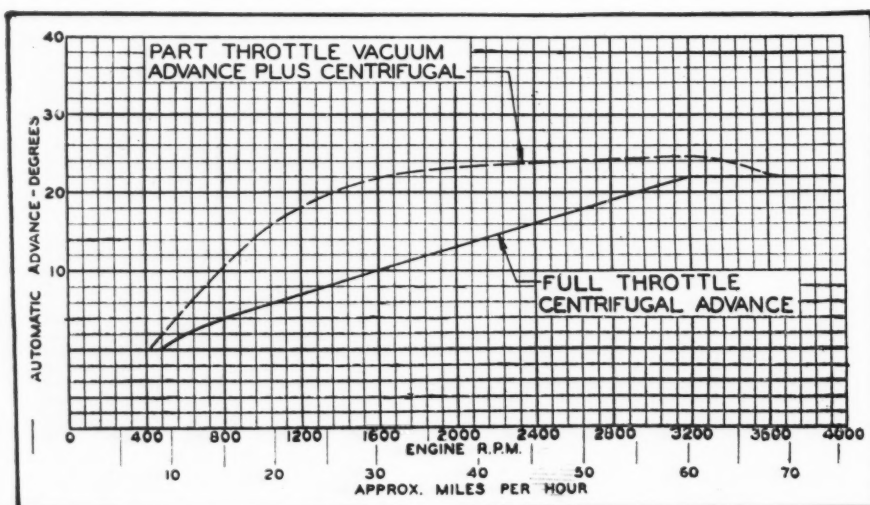
|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .017 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance      | .015 in.      |
| Ignition Timing      | 7 Deg. B.T.C. |
| Compression Pressure | 110 lbs.      |

### Tension Specifications (Foot-pounds)

Cylinder head nuts, 65 to 70; connecting rod bolt nuts, 50 to 55; main bearing bolts, 70 to 73.

# OLDSMOBILE 1942

## Models 66 and 76

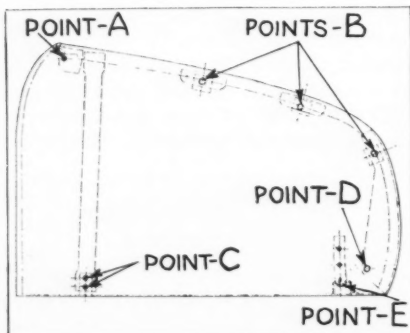
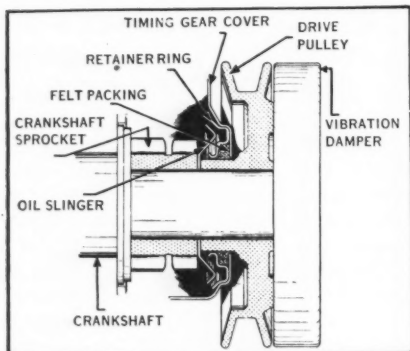


### Engine

Six-cylinder,  $3\frac{1}{2} \times 4\frac{1}{8}$  in. Displacement 238.1 cu. in. Maximum brake hp. 100 at 3400 r.p.m. Compression ratio 6.5 to 1. Compression pressure at cranking speed, 115 lbs.

### Pistons

Armasteel, tin-plated. Removed from above. Install in engine with mark "VS" on head of piston toward valve side of engine, and fit with .0015



in. clearance between thrust side and cylinder wall.

### Piston Rings

Two  $\frac{3}{32}$  in. compression rings and two  $\frac{3}{16}$  in. oil rings. Compression ring gap .008 to .018 in., oil ring gap .007 to .015 in.

### Connecting Rods

Removed from above. Install in engine with oil-spray hole toward camshaft side. Bearings slip-in type, designed with slight projection above rod and cap faces to insure crush fit in rod when cap bolts are tightened. Fit with .0005 to .0025 in. clearance on crankshaft.

### Main Bearings

Slip-in type. Rear main bearing oil seal is pressed into groove in block and in bearing cap, and vertical slots in cap have cork seals.

### Valve Timing

Intake valve opens 5 deg. or 2 flywheel teeth before top dead center. Timing marks on flywheel. Valves

### TUNE-UP DATA

|                           |          |
|---------------------------|----------|
| Breaker Point Gap.....    | .020 in. |
| Spark Plug Gap.....       | .040 in. |
| Valve Clearance, In.....  | .008 in. |
| Ex. ....                  | .011 in. |
| Ignition Timing.....      | T.C.     |
| Compression Pressure..... | 115 lbs. |

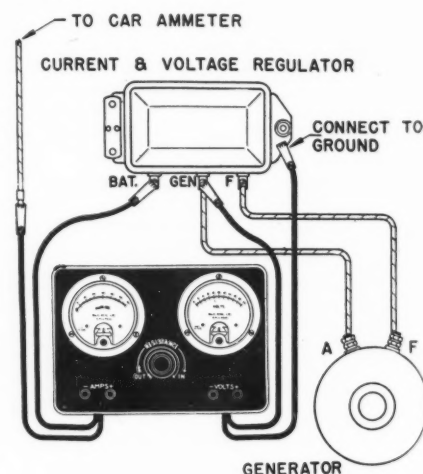
properly timed when punch marks on crankshaft and camshaft sprockets are together and in line with shaft centers.

### Valves

Inlet valve seat angle 30 deg., exhaust angle 45 deg. Operating tappet clearance, inlet .008 in., exhaust .011 in.

### Remove Fender Extension

To remove fender extension on door panel, first mask door panel to prevent scratching paint. Remove self-tapping screw "A" from front flange; door in wide-open position. Remove bolts "C" and "D" on Series 98 and "C" and "E" on Series 68 and 78. Spring fender panel out at bottom and loosen screws "B". Slide panel back and lift up, unhooking panel from screws "B".



### Generator

Cars equipped with Hydra-Matic Drive have smaller diameter generator pulley than standard to provide adequate output at low engine speed. To test generator output, ground field terminal of regulator, connect positive test ammeter lead to BAT terminal, negative to ground. Maximum output 33 amps.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60 to 70; connecting rod bolt nuts, 50 to 55; main bearing bolts, 100 on front, front center and rear center bearings, and 140 on rear bearing.

# 1942 OLDSMOBILE

## Models 68, 78 and 98



### Engine

Eight-cylinder,  $3\frac{1}{4} \times 3\frac{3}{8}$  in. Displacement 257.1 cu. in. Maximum brake hp. 110 at 3600 r.p.m. Compression ratio 6.5 to 1. Compression pressure at cranking speed, 107 lbs.

### Ignition Timing

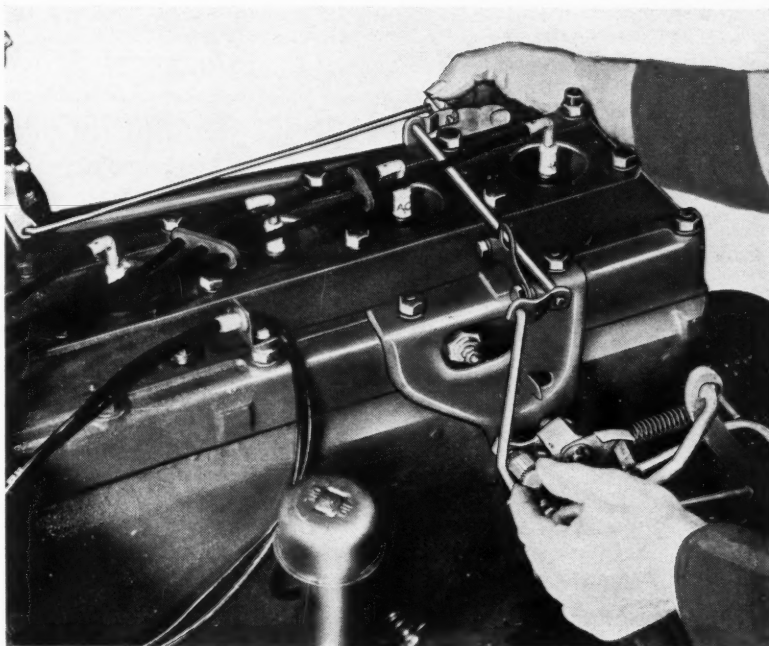
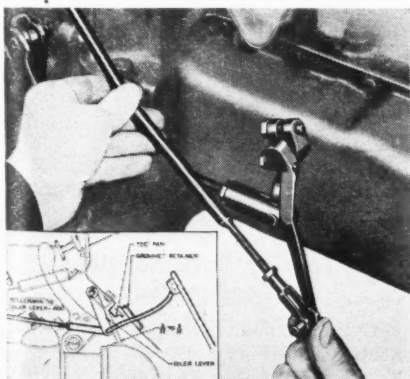
Adjust distributor so that No. 1 cylinder fires when steel ball in fly-wheel lines up with pointer on housing. If dial indicator is used in spark plug hole, ignition occurs when piston is .002 in. before top dead center.

### Brakes

Bendix hydraulic, single anchor. For minor adjustment, disconnect hand brake cable at equalizer link, expand notched adjusting wheel until shoes are tight against drums. Pull hand brake cables forward and adjust clevis to remove all slack so clevis pin will enter through clevis and equalizer link when link is parallel with propeller shaft. Back off notched adjusting wheel at each brake approximately 20 notches.

### Hydra-Matic Throttle Control

Disconnect transmission throttle rod at transmission. Adjust engine idle at 375 r.p.m., install trunnion nut lock at rear end of throttle rod and adjust nut until gage pin No. J-1469 will enter through holes in bell crank and bracket. Reinstall trunnion nut lock. Holding transmission throttle lever against idle stop in transmission, and with carburetor on slow idle, adjust length of throttle rod so clevis pin slips freely through clevis and lever.



Shorten the rod by one full turn of the clevis, install clevis pin and tighten clevis lock nut. Adjust accelerator

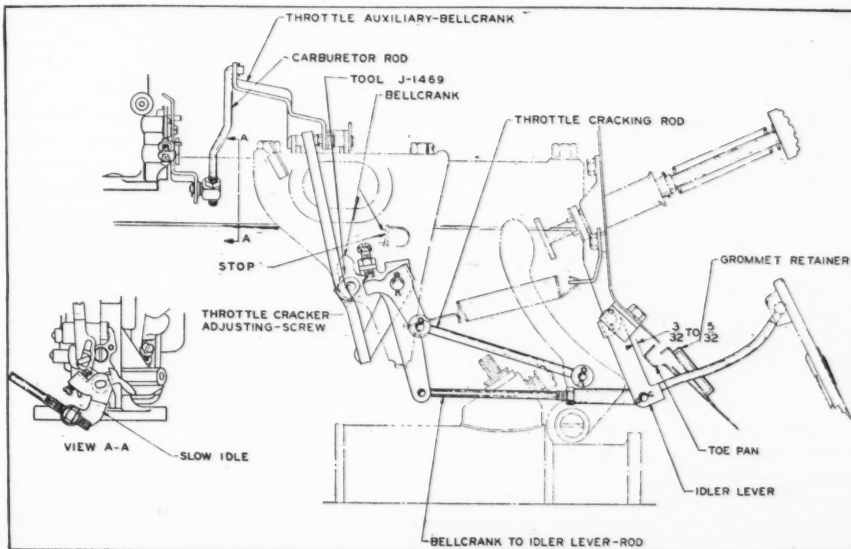
pedal idler lever to bell crank rod to give  $\frac{3}{32}$  to  $\frac{5}{32}$  in. clearance between lever and bead on toe pan, with carburetor on slow idle. Adjust the automatic throttle opening and fast idle.

### TUNE-UP DATA

|                      |       |               |
|----------------------|-------|---------------|
| Breaker Point Gap    | ..... | .015 in.      |
| Spark Plug Gap       | ..... | .030 in.      |
| Valve Clearance, In. | ..... | .008 in.      |
| Ex.                  | ..... | .011 in.      |
| Ignition Timing      | ..... | 2 Deg. B.T.C. |
| Compression Pressure | ..... | 107 lbs.      |

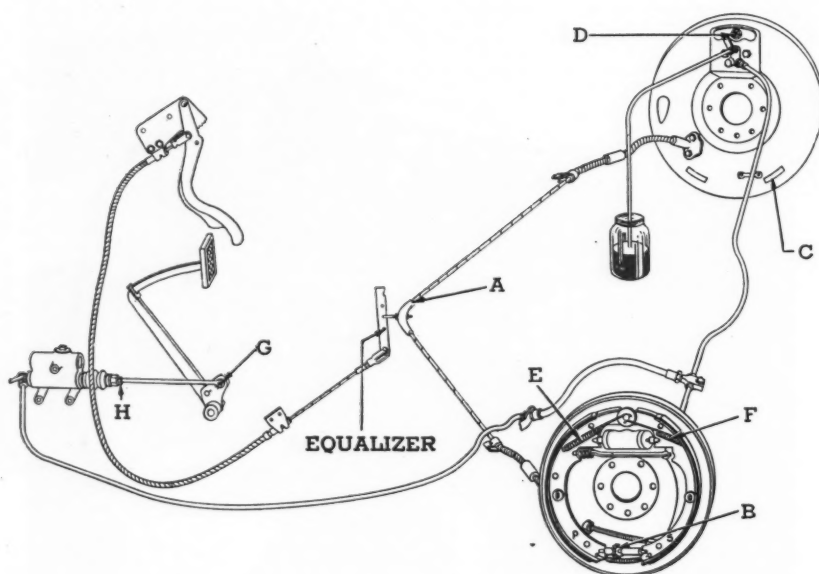
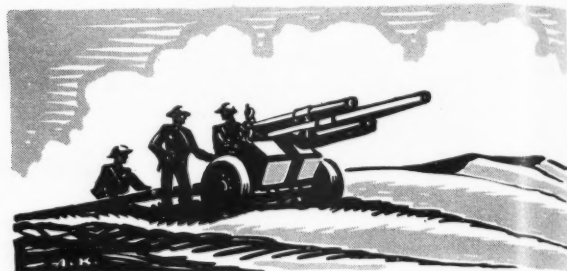
### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60 to 70; connecting rod bolt nuts, 50 to 55; main bearing bolts, 100 on front, front center and rear center bearings, and 140 on rear bearing.



# PACKARD 1942

## Models 2000, 2020

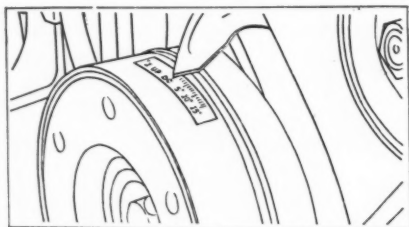


### Engine

Six cylinder,  $3\frac{1}{2} \times 4\frac{1}{4}$  in. Displacement 245 cu. in. Maximum brake hp. 105 at 3600 r.p.m. Compression ratio 6.71 to 1.

### Pistons

Aluminum alloy, cam ground, T-slot. Remove from above. Fit in cylinder with .0015 in. clearance on solid skirt side of piston. Install with slot in skirt toward camshaft side of engine.



### Connecting Rods

Remove from above. Bearings are slip-in type. Install in cylinder with oil spray hole toward camshaft side of engine.

### Carburetor

Carter, Model WA1-530-S. Float level should be set at  $\frac{3}{8}$  in., measured from projection on bowl cover to upper edge of soldered seam of float, with bowl cover and float assembly inverted.

### Brakes

Bendix, two-shoe, single anchor. To adjust, disconnect hand brake cable at clevis "A". Insert a .015 in. feeler gage between the drum and the lining of the rear shoe about  $1\frac{1}{2}$  in. from the adjusting screw end, at "C". Expand the adjusting screw "B" until a light drag is felt on the gage. Then check the clearance at a point approximately  $1\frac{1}{2}$  in. from the anchor end of the same shoe; gage should be a slightly tighter fit there than at the adjusting screw end. Then expand the adjusting screw "B" on the rear brakes until wheels can just be turned over with two hands. Expand the adjusting screw at the front brakes until the shoes drag lightly on the drums, then back it off until wheels turn freely. Pull hand brake lever to first notch of the ratchet, then pull the hand brake cable forward to take out all slack and adjust the clevis so the pin will enter freely. Release the hand brake lever. Then back off the ad-

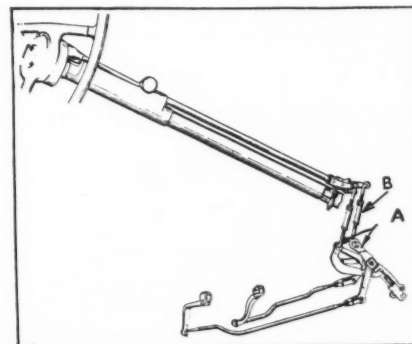
justing screw "B" on the rear brakes until the wheels turn freely. Next, adjust master cylinder piston rod at "H" to allow  $\frac{1}{4}$  to  $\frac{1}{2}$  in. free pedal travel before master cylinder piston starts to move.

### Gear Shift Adjustment

Remove cotter pins, and disconnect rods at levers "A". Place operating levers at bottom of steering column in neutral position and insert  $\frac{3}{16}$  in. pin through alining holes to hold them in position. Place operating levers at transmission in neutral position. Adjust turnbuckles "B" until rods will enter holes in levers "A" freely. Install rods and cotter pins, and remove aligning pin from operating levers.

### Generator

Auto-Lite, Model GDZ-4801F, with Delco-Remy current and voltage regulator. Maximum charging rate 35 amperes, at 8 volts. Circuit breaker



contact points close at 6.4 to 6.6 volts, and open at 4 to 6 amperes discharge. Regulator set to control generator output at 34 to 36 amperes.

### Distributor

Breaker arm spring tension, 17 to 20 oz. Point gap .020 in. Cam angle 38 deg.

### Ignition Timing

Timing marks on vibration damper. Adjust distributor so that ignition occurs 4 deg. B.T.D.C.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60 to 62; connecting rod bolt nuts, 45 to 46; main bearing cap bolts, 82 to 85.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .020 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance, In. | .007 in.      |
| Ex.                  | .010 in.      |
| Ignition Timing      | 4 deg. B.T.C. |



# 1942 PACKARD

## Models 2001, 11, 21

### Engine

Eight cylinder,  $3\frac{1}{4} \times 4\frac{1}{4}$  in. Displacement 282 cu. in. Maximum brake hp., 125 at 3600 r.p.m. Compression ratio 6.85 to 1.

### Pistons

Remove from above. Install in engine with slotted skirt toward camshaft side, and fit with .0015 in. clearance on plain side of piston.

### Piston Rings

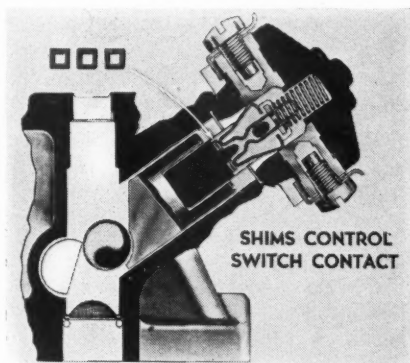
Top compression ring has groove on inside edge, and should be installed with the groove toward top of piston. Second compression ring has groove on outer edge, and should be installed with this groove toward bottom of piston. Oil ring is X-90 type.

### Carburetor

Carter, Model WDO-512-S. Float level  $\frac{5}{32}$  in. between float and bowl cover, with assembly inverted and needle closed. Climatic control should be set at center mark on scale.

### Ignition Timing

Adjust distributor so spark occurs 5 deg. B.T.D.C., as indicated by scale on vibration damper.



### Starter Switch

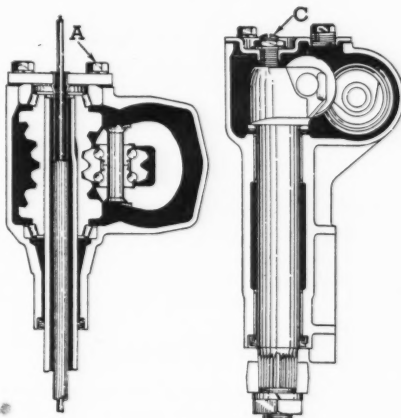
Operated by accelerator pedal. Throttle valve should open between 30 and 40 deg. before switch contact is made. Adjusted by shims under switch contact spring.

### Radiator Core Removal

Radiator core assembly can be removed without removing front fender and grille. Remove pan between core and grille, remove hose connections and core-to-frame attaching bolts, and lift core straight up.

### Distributor

Auto-Lite, Model IGP-4502-A, centrifugal and vacuum advance. Breaker arm spring tension 19-23 oz. Breaker point gap .015 in. Cam angle 27 deg.

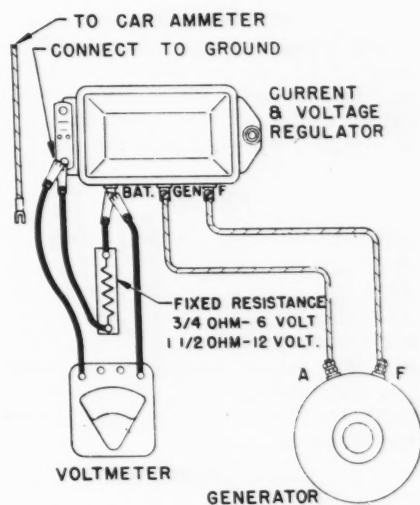


### Generator

Auto-Lite, Model GDZ-4801-F, current and voltage regulation. To check operation of cut-out relay, disconnect wire from "BAT" terminal and connect test voltmeter between that terminal and ground. Relay points should close at 6.2 to 6.7 volts. To adjust, push armature down until points just close and measure air gap between armature and center of core; should be .020 in. To adjust air gap, loosen two screws at back of relay and raise or lower armature as required. Point gap should be .020 in.; bend upper armature stop to adjust gap.

### TUNE-UP DATA

|                           |               |
|---------------------------|---------------|
| Breaker Point Gap.....    | .015 in.      |
| Spark Plug Gap.....       | .028 in.      |
| Valve Clearance, In. .... | .007 in.      |
| Ex. ....                  | .010 in.      |
| Ignition Timing .....     | 5 Deg. B.T.C. |



### Steering Gear

To adjust worm shaft end play, disconnect steering connecting rod, turn steering wheel to extreme position and then back off  $\frac{1}{4}$  turn. Loosen the worm cover screws "A" and remove one gasket from between end plate and housing; tighten end plate and recheck. To adjust cross shaft end play, place steering gear in starting position as above and tighten adjusting screw "C". To adjust mesh between worm and roller it is necessary to remove cross shaft from housing and remove shims from between roller bracket and housing.

### Windshield Glass Removal

It is not necessary to remove the chrome molding to replace windshield glass. Remove windshield wiper blade and arm. Remove center division bar screws which will release vertical chrome strip on front of windshield. Remove garnish molding. Remove windshield rubber weatherstrip from around opening. Push the glass in at the upper outside corner, and remove the complete glass as an assembly.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60 to 62; connecting rod bolt nuts, 45 to 46; main bearing cap screws, 82 to 85.

# PLYMOUTH 1942

## Model P-14



### Engine

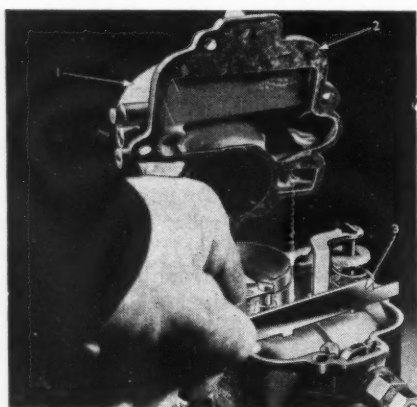
Six cylinder,  $3\frac{1}{4} \times 4\frac{1}{4}$  in. Displacement 217.8 cu. in. Maximum brake hp., 95 at 3400 r.p.m. Compression ratio 6.8 to 1. Compression pressure at cranking speed, 125 to 135 lbs.

### Pistons

Cast iron, cam ground. Removed from above. Fit in cylinder with .0015 in. clearance of thrust side. Available in standard size and following oversizes: .003 in., .010 in., .020 in., .023 in., .030 in., .040 in., .050 in., and .060 in. Fit piston pins to light thumb push fit in piston and connecting rod.

### Connecting Rods

Removed from above. Install in engine with oil hole toward camshaft, and with long side of offset bearing toward front in cylinders 2, 4 and 6, and toward rear in cylinders 1, 3 and 5. Bearings are slip-in type.

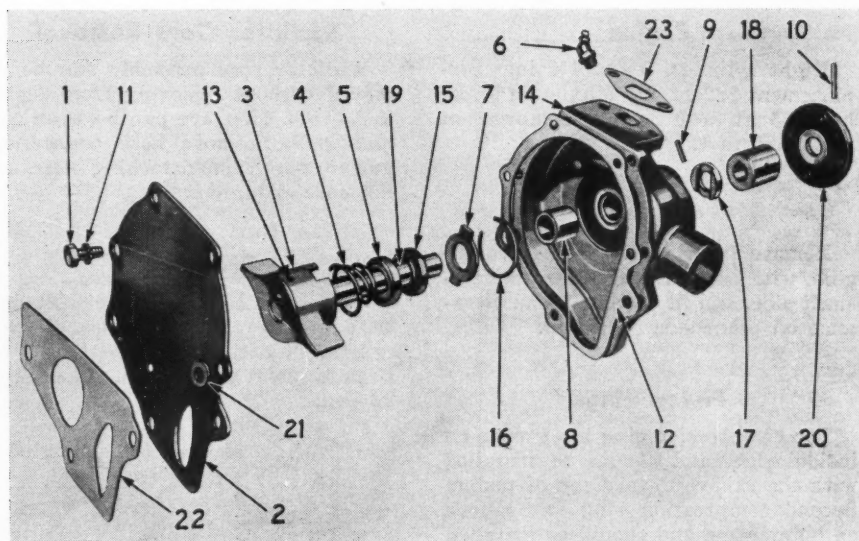


### Carburetor

Carter, Ball & Ball type,  $1\frac{1}{2}$  in. downdraft. Turn idle adjusting screw out for rich mixture, in for lean. To adjust float level, remove air horn and gasket. Distance from top of float chamber (gasket removed) to top of float should be  $\frac{5}{64}$  in. Set accelerating pump rod in center hole of operating lever for normal operation. Fuel pump pressure should be 3 to  $4\frac{1}{2}$  lbs.

### Valve Timing

Valves are correctly timed when punch marks on crankshaft and camshaft sprockets are together and in line with shaft centers.



### Distributor

Centrifugal and vacuum advance. Breaker arm spring tension 16 to 19 oz. Cam angle  $34\frac{1}{2}$  to 38 deg. Point gap .020 in. Maximum advance 20 deg.

### Ignition Timing

Timing marks on vibration damper. Adjust distributor so spark occurs at top center, then make minor adjustment for best road performance by loosening adjusting control arm lock screw and advancing or retarding distributor.

### Generator

Equipped with vibrator type current and voltage regulator. Maximum output 35 amps. at 8 volts. Cut-out relay points close at 6.6 to 6.9 volts.

### Battery

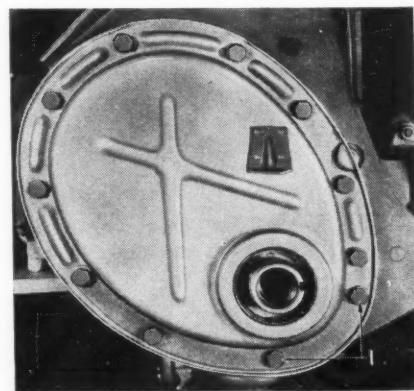
Auto-Lite, 15 plate, 95 ampere hour capacity. Positive terminal grounded.

### Toe-In Adjustment

Desired toe-in is zero to  $\frac{1}{16}$  in. To adjust, first place front wheels in straight ahead position, then turn each tie rod an equal amount.

### Main Bearing Cap Removal

To remove front main bearing cap, it is necessary to remove two cap screws in timing chain cover—one immediately below crankshaft and one next to it and beside crankshaft—which hold oil pan front end oil seal plate to bearing cap.

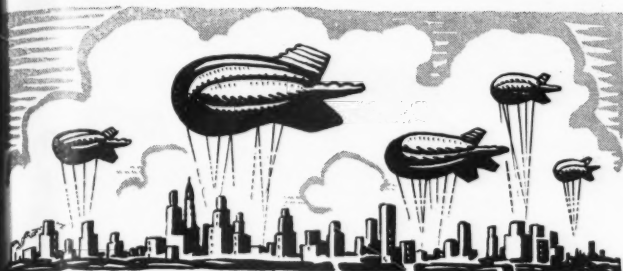


### Tension Specifications (Foot-pounds)

Cylinder head cap screws, 65 to 70; main bearing cap screws, 80 to 85; connecting rod nuts, 45 to 50.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .020 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance, In. | .008 in.      |
| Ex.                  | .010 in.      |
| Ignition Timing      | 3 Deg. B.T.C. |
| Compression Pressure | 125 lbs.      |



# 1942 PONTIAC

## Model 25 and 26

### Engine

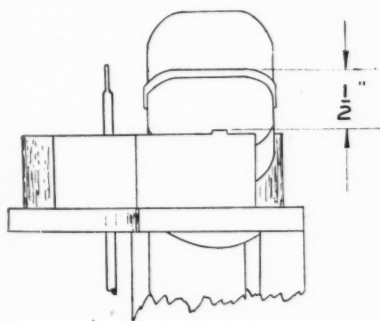
Six-cylinder, 3 9/16 x 4 in. Displacement, 239.2 cu. in. Maximum brake hp., 90 at 3200 r.p.m. Compression ratio, 6.5 to 1, with optional ratio of 7.5 to 1. Compression pressure at cranking speed, 160 lbs.

### Pistons

Alloy cast iron, fitted in cylinder with .0015 in. clearance on thrust side of piston. Remove from above.

### Carburetor

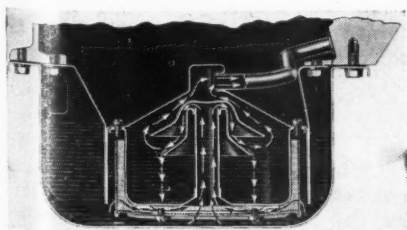
Carter, Model WA1-494-S, 1 1/4 in. single downdraft, used on early production; has white metal body. Carter Model W1-545-S, with cast-iron body, used in later production. To set float level on WA1-494-S carburetor, invert bowl cover and float assembly and measure from projection on bowl cover to top of soldered seam at free



end or float; distance should be 1/2 in. Float level of model W1-545-S carburetor is measured between float and surface of bowl cover, with float and cover assembly removed and inverted. Distance is 11/16 in.

### Valve Timing

Intake valve opens 5 deg. or 2 flywheel teeth before top center. Valves are properly timed when punch marks on crankshaft and camshaft sprockets are together and in line with shaft centers.



### Piston Rings

Two 3/32 in. compression rings above the pin, one 3/16 in. oil ring below the pin. Ring gap, .007 to .012 in.

### Connecting Rods

Remove from above. Bearings are slip-in type, replaced without removing rod from engine. Fit with .0015 in. clearance.



### Ignition Timing

Timing marks on flywheel, visible through opening in left side of housing. There are three marks on flywheel, the first indicates 6 deg. before top center, the second is 2 deg. and the last is the top center mark. Timing should be set between 2 and 6 deg. with octane selector pointer on zero, and final adjustment for road performance made by shifting distributor octane selector for best performance according to octane value of fuel used.

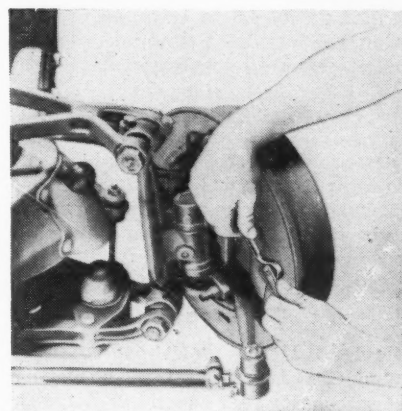
### Valves

Operating valve tappet clearance, .011 to .013 in. Intake valve seat angle, 30 deg., exhaust, 45 deg.

### Distributor

Delco-Remy, Model 647-D. Centrifugal and vacuum advance. Breaker

point gap, .020 in. Breaker arm spring tension, 17-21 oz. Cam angle, 37 deg.



### Brakes

Bendix hydraulic. Front brake lining, molded, size 3/16 x 2 x 21 5/16 in. Rear brake lining, molded, size 3/16 x 1 3/4 x 21 5/16 in. Front brake wheel cylinders are 1 1/16 in. diameter, rear brake cylinders are 15/16 in. diameter.

### Brake Adjustment

Secondary shoe provided with eccentric adjuster. Turn adjusting screw in direction of forward wheel rotation until brake drags, then back it off until a .010 in. feeler gage can be inserted between lining and drum at a point opposite eccentric. Then expand adjusting wheel at bottom of shoes until brake drum drags, then back it off until .010 in. feeler gage can be inserted between lining and drum at center of primary shoe.

### Propeller Shaft Removal

Remove four screws holding universal joint to rear axle companion flange. Use piece of soft wire, or heavy rubber band to place around universal joint trunnions to prevent them from falling off the universal joint cross shaft. Lower rear end of propeller shaft and pull toward rear to disengage it from front joint.

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60; connecting rod bearing bolt nuts, 45; main bearing cap screws, 85.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .020 in.      |
| Spark Plug Gap       | .028 in.      |
| Valve Clearance      | .012 in.      |
| Ignition Timing      | 4 Deg. B.T.C. |
| Compression Pressure | 160 lbs.      |

# PONTIAC 1942

## Models 27 and 28



### Engine

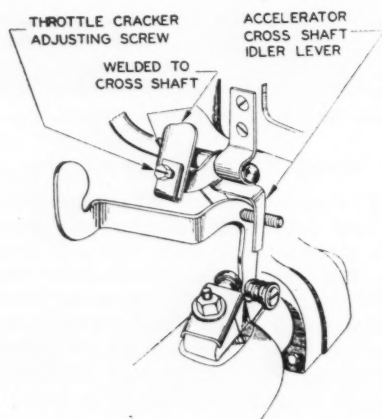
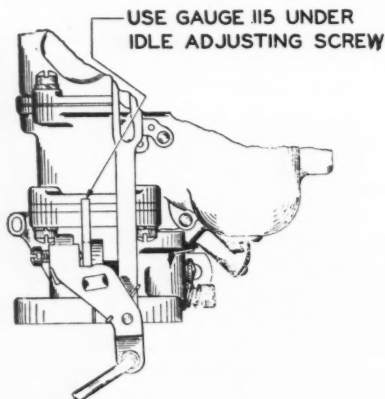
Eight-cylinder,  $3\frac{1}{4} \times 3\frac{3}{4}$  in. Displacement, 248.9 cu. in. Maximum brake hp., 103 at 3500 r.p.m. Compression ratio, 6.5 to 1 standard, with optional 7.5 to 1. Compression pressure at cranking speed, 158 lbs.

### Oil Pan Removal

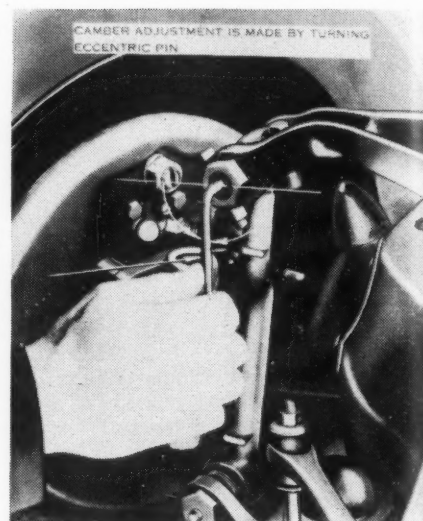
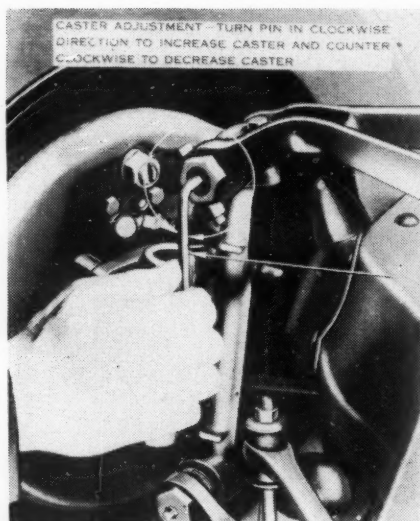
Remove front-crossmember-to-radiator-support aprons to uncover oil pan front-end cap screws. Aprons can be lifted out in a circular motion from inside engine compartment.

### Carburetor

Carter, Model WDO-540-S, dual downdraft,  $1\frac{1}{4}$  in. Idle adjusting screws control fuel—turn out for rich and in for lean mixtures. To provide



proper throttle opening with starter pedal movement, insert .115 in. thickness gage between throttle stop screw at carburetor. Disconnect battery lead to starting switch, push starter



pedal to full down position and adjust throttle cracker adjusting screw so that thickness gage under throttle stop screw will just fall out.

### Clutch Removal

Before removing clutch from flywheel, mark cover and flywheel to show installation position. There are no locating dowels in flywheel, and clutch cover must be reinstalled in original position to maintain balance.

### Steering Gear Adjustment

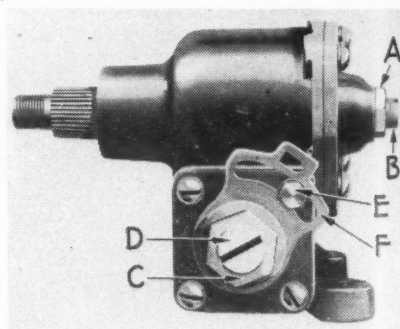
To remove roller shaft end play, tighten the four round-head cap screws holding side cover to housing; loosen lock nut "A"; turn steering gear to extreme position but just short of stop, and tighten screw "B"; back it off and tighten again until you can just feel it bearing against the shaft. Tighten lock nut.

To remove worm shaft end play, tighten the three round-head screws holding end cover to housing. Loosen lock nut "C"; and, with steering turned just short of extreme position, tighten screw "D" to secure load of  $\frac{3}{8}$  to  $\frac{5}{8}$  lbs. pull on rim of steering wheel. Tighten lock nut.

To remove backlash between worm and roller, center steering gear. Loosen clamp screw "E" and tap lash adjuster "F" in direction of arrow until pull of  $1\frac{1}{4}$  to  $1\frac{3}{4}$  lbs. is secured at rim of wheel. Tighten clamp screw.

### Front Wheel Alinement

Desired caster angle is negative  $\frac{3}{4}$  deg., plus or minus  $\frac{1}{4}$  deg. Desired



camber angle is zero, plus or minus  $\frac{1}{4}$  deg. Caster and camber angles are obtained by turning eccentric threaded pin in upper control arm yoke. Desired toe-in is zero to  $1/16$  in., obtained by turning both tie rods an equal amount.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .015 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance      | .012 in.      |
| Ignition Timing      | 4 Deg. B.T.C. |
| Compression Pressure | 160 lbs.      |

### Tension Specifications (Foot-pounds)

Cylinder head bolts, 60; connecting rod bearing bolt nuts, 45; main bearing cap screws, 85.



# 1942 STUDEBAKER

## Champion

### Engine

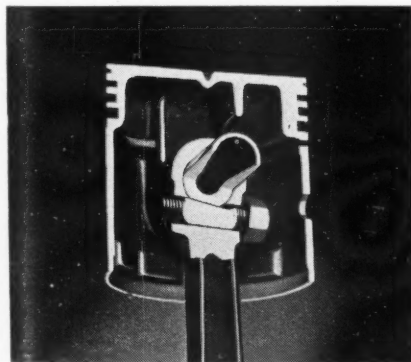
Six-cylinder, 3 x 4 in. Displacement, 169.6 cu. in. Maximum brake hp., 80 at 4000 r.p.m. Compression ratio, 6.5 to 1 standard; optional, 7 to 1. Compression pressure at cranking speed, 105 lbs.

### Pistons

Iron alloy. Remove from above. Install in engine with pattern number toward front. Number is located inside the piston, near one of the pin bosses. Some cases the number is on a raised boss on inside of piston skirt. Install this type piston with boss toward camshaft side of engine.

### Piston Pin Removal

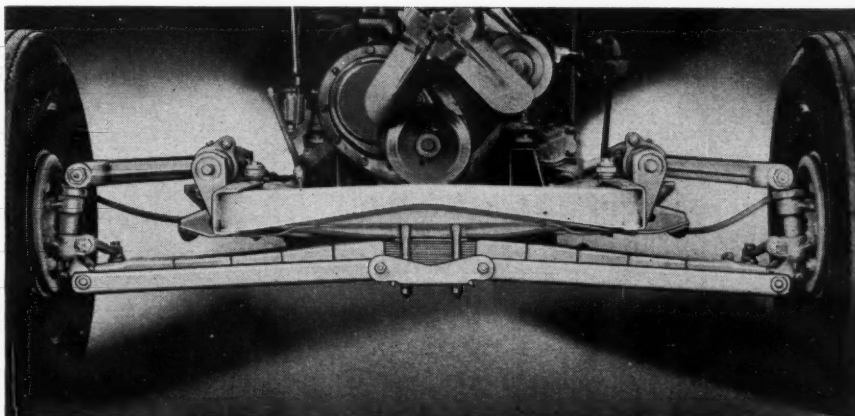
Pin is held in connecting rod by tapered pin with a nut on each end. End of tapered pin having screw driver slot is the big end. To remove the tapered pin from the rod, remove the lock nut from the plain end and tighten the lock nut on the slotted end. This will draw the tapered pin



out of the rod. When installing, remove both nuts from pin, insert pin in rod with slotted end up. Then install nut on plain end and tighten, drawing pin into rod. When tight, install nut on slotted end and tighten.

### Connecting Rods

Bearings are spun in rod, not adjustable. Remove from above. Rods are offset at bearing end, and are stamped with the cylinder number in which they should be installed. The number is on the same side of the rod as the oil-spray hole, and should be installed with that side toward the camshaft.



### Main Bearings

Steel back, babbitt-lined, slip-in type.

### Distributor

Auto-Lite, Model IGC-4801, centrifugal and vacuum advance. Breaker arm spring tension, 17 to 20 oz. Point gap, .020 in. Cam angle, 35 deg.

### Carburetor

Carter, Model WA1, 1 1/4 in., single downdraft. Float level should be set with bowl cover and float assembly inverted; distance from machined boss on cover to top of soldered seam of float should be 5/16 in.

### Front Wheel Alinement

Position of second cross member of the frame controls the caster angle, and is not adjustable. The camber angle is controlled by shims placed between the frame side rails and the brackets holding the upper control arms. Camber should be checked with car unloaded, and set at 1/4 to 3/4 deg. To adjust toe-in, set the left front wheel straight ahead by adjusting the left reach rod. Then tighten the clamp bolts so that the left rod will remain in that setting. Obtain the

desired toe-in of 1/16 to 1/8 in, by loosening the two clamp bolts on the right reach rod and turning the rod.

### Brakes

Lockheed, single anchor. Brake drum diameter, 9 in. Lining per wheel, 3/16 in. x 1 3/4 in. x 17 3/4 in. To adjust for wear, turn eccentric out until drum drags on lining, then back it off until drum turns freely. Repeat at each shoe and at each wheel.

When installing relines shoes, adjust the anchor pin to allow .005-in. clearance at the lower end of the primary shoe and .010-in. clearance at the upper end.

### Transmission Service

If difficulty is encountered in correcting isolated cases of the transmission jumping out of second or high gear, it may be necessary to install a new synchronizer sleeve, Part No. 516732, which is grooved at three points in each end. The grooves serve as detents to help hold the synchronizer in position.

### Axle Shaft Oil Seal

When it becomes necessary to replace the rear axle shaft bearing inner grease seal, a new leather seal, Part No. 516330, should be used. No retainers are needed, as the seal and retainers are supplied as an assembly.

### Tension Specifications (Foot-pounds)

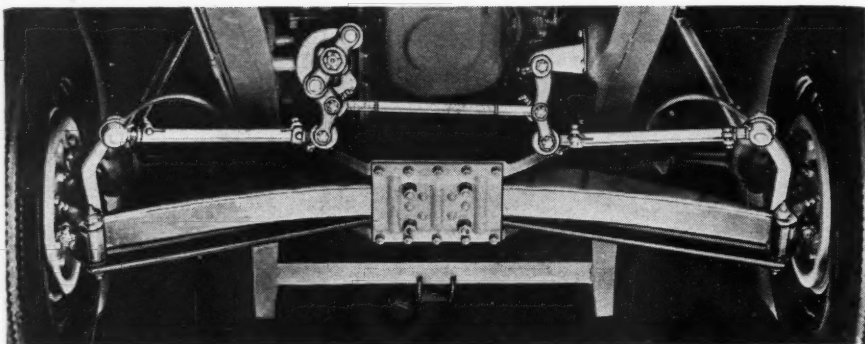
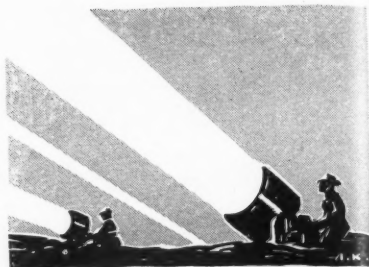
Cylinder head cap screws, 50 to 55; connecting rod bolt nuts, 25 to 27; main bearing cap screws, 90.

### TUNE-UP DATA

|                      |               |
|----------------------|---------------|
| Breaker Point Gap    | .020 in.      |
| Spark Plug Gap       | .025 in.      |
| Valve Clearance      | .016 in.      |
| Ignition Timing      | 2 Deg. B.T.C. |
| Compression Pressure | 105 lbs.      |

# STUDEBAKER 1942

## President



### Front Wheel Alinement

Caster angle is negative  $\frac{1}{4}$  to positive  $\frac{3}{4}$  deg., and is controlled by the position of the front spring where it is attached to the frame. Caster angle is not adjustable. Camber angle is adjustable by placing shims between the steering knuckle upper support arms and the frame. Desired angle is  $\frac{1}{2}$  deg. Follow instructions given for Champion model for adjusting toe-in.

### Brake Adjustment

Adjustment of the front brake anchor pin screws is made with an Allen wrench having a  $\frac{1}{4}$  in. dimension when measured across the hexagonal section flats. It is only necessary to loosen the lock nut before inserting the wrench.

### Engine

Eight-cylinder,  $3\frac{1}{16} \times 4\frac{1}{4}$  in. Displacement, 250.4 cu. in. Maximum brake hp., 117 at 4000 r.p.m. Compression ratio, 6.5 to 1 standard, 7.0 to 1 optional. Compression pressure at cranking speed, 105 lbs.

### Carburetor

Stromberg Model AAV-26, dual downdraft. Fuel level should be at the bottom of the sight hole in the float bowl.

### Pistons

Iron alloy, cam ground. Follow installation instructions given for Champion model.

### Connecting Rods

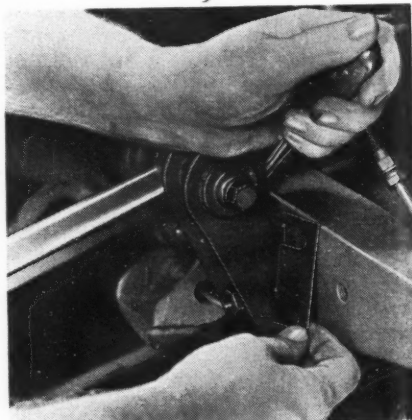
Remove from above. Bearings are steel back babbitt, slip-in type. Follow installation instructions given for Champion Model.

### Fluid Coupling Removal

To remove the fluid coupling, it is necessary to remove from the chassis as a complete unit the engine and transmission assembly including the fluid coupling, clutch and clutch housing. With the assembly out of the chassis, it is necessary to remove the engine oil pan, rear main bearing cap and the metal cover plate on the front face of the engine rear plate, and the screws which hold the fluid coupling assembly to the crankshaft in order to remove the coupling.

### Distributor

Auto-Lite IGH-4029, centrifugal and vacuum advance. Four-lobe cam with two sets of breaker points. Set breaker point gap to .020 in. Adjust distributor so that No. 1 cylinder fires when "UDC 1-8" mark on vibration damper lines up with pointer on timing gear case; shift movable points bracket so that No. 6 cylinder fires next, and when "UDC 3-6" mark on damper lines up with pointer. Firing order 1-6-2-5-8-3-7-4. Stationary points fire cylinders No. 1-2-7-8, and movable points fire Nos. 3-4-5-6.



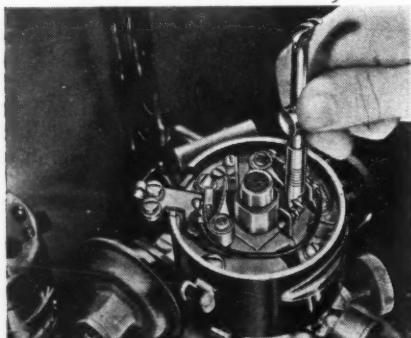
### Ignition Timing

To set ignition timing, place the octane selector with the pointer in the center of the scale. Place No. 1 piston on top center, as indicated by marks on vibration damper, and adjust distributor so that points just start to break.

Then road-test car, and set the octane selector in advanced position to produce "ping" under hard pull, and then retard selector until "ping" is just removed. Firing order is 1-6-2-5-8-3-7-4.

### Valve Timing

Timing marks on vibration damper. Set No. 1 intake valve tappet clearance at .020 in., and valve should just start to open when "IN OP 1 & 8" mark on vibration damper is under pointer on timing-gear case. If timing case cover is removed, set camshaft gear so that tooth with punch mark indexes between the two punch-marked teeth of crankshaft gear.

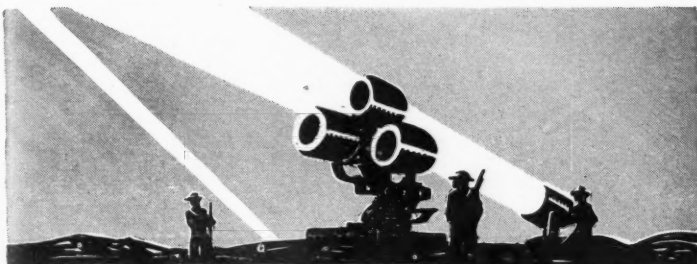


### TUNE-UP DATA

|                      |            |
|----------------------|------------|
| Breaker Point Gap    | .020 in.   |
| Spark Plug Gap       | .025 in.   |
| Valve Clearance      | .016 in.   |
| Ignition Timing      | Top Center |
| Compression Pressure | 105 lbs.   |

### Tension Specifications (Foot-pounds)

Cylinder head cap screws, 83; connecting rod bolt nuts, 55; main bearing cap screws, 90.



1942

# WILLYS

## Model 442

### Engine

Four-cylinder, 3 1/4 x 4 3/4 in. Displacement 134.2 cu. in. Maximum brake hp. 63 at 3800 r.p.m. Compression ratio 6.4 to 1. Compression pressure at cranking speed 111 lbs.

### Pistons

Alloy iron. Removed from above. Fit in cylinders with .002 in. clearance on thrust side.

### Connecting Rods

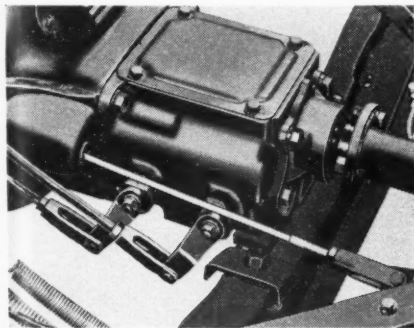
Bearings are steel-back babbitt, slip-in type, replaced without removing rods from engine. Remove from above.

### Main Bearings

Steel-back babbitt, slip-in type, replaced without removing crankshaft from engine. Fit with .001 in. clearance. Crankshaft end play .004 to .006 in.

### Valve Timing

Intake valve opens 9 deg. before top center, or when "IO" mark on flywheel is in center of opening in right side of flywheel housing.



### Distributor

Auto-Lite Model IGW-4129, centrifugal and vacuum advance. Breaker arm spring tension 17-20 oz. Cam angle 41 deg. Point gap .020 in.

### Ignition Timing

Spark occurs at top center, or when "TG-IGN" mark on flywheel is in center of opening in flywheel housing.

### Carburetor

Carter, Model WO-507-S, 1 1/4 in. single, downdraft. Idle screw controls gas—turn in for lean, out for rich. Float level is 3/8 in. measured between machined surface of the bowl cover and the float, with cover and float assembly inverted.

### Clutch

When installing new clutch driven plate, the long side of the hub should be toward the rear.

### Generator

Auto-Lite, Model GCJ-4811-A, 3rd brush control, with voltage regulator. Maximum output 24 to 26 amps. at 8 volts.

### Brakes

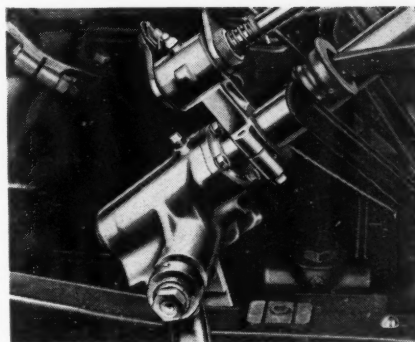
Bendix, two-shoe, double-anchor, hydraulic. Brake-lining size, 3/16 x 1 1/4 x 16 53.64 in. per wheel. Hand brake operates on rear wheels only.

### Brake Adjustment

Turn the eccentric adjusting screw to force the shoe out against the drum, then back it off until wheel rotates without brake drag. Repeat eccentric adjustments at each shoe, and at each wheel. If necessary to adjust anchors, set the shoes with .005 in. clearance at the anchor ends and .008 in. clearance at the wheel cylinder ends.

### Gear Shift Adjustment

To adjust the remote control gear shift, disconnect the shifter rods at the transmission end, and place the shifting levers at the transmission in neutral position. Next, place a piece of 1/4 in. drill rod through the alining holes in the operating levers at the

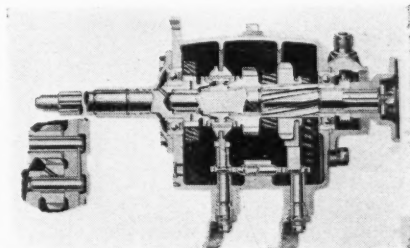


bottom of the steering column, to hold these levers in neutral position. Then adjust the length of the shifter rods by turning the yokes so that the clevis pins will slip freely through holes in clevis and operating levers. Remove the drill rod from the operating levers at the steering column.

### Oil Pressure

Oil pressure regulator can be adjusted by removing or adding steel shims in the spring retainer on the oil pump. Pressure should be 75 lbs. at 30 m.p.h.

When installing oil pump, be sure No. 1 piston is on top center and that distributor rotor is at No. 1 terminal of distributing cap.



### Transmission Removal

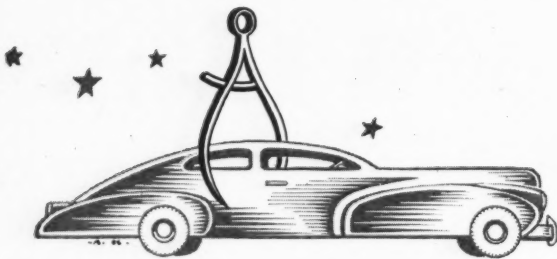
When removing transmission, it is necessary to jack up the rear of the engine so that the mounting bracket at the rear of the transmission can be removed. Lift transmission up over cross member and remove from above.

### Tension Specifications (Foot-pounds)

Cylinder-head screws, 65 to 75; cylinder-head stud nuts, 60 to 65; Main-bearing cap screws, 65 to 70; Connecting rod bolt nuts, 50 to 55.

### TUNE-UP DATA

|                      |          |
|----------------------|----------|
| Breaker Point Gap    | .020 in. |
| Spark Plug Gap       | .030 in. |
| Valve Clearance      | .014 in. |
| Ignition Timing      | T.C.     |
| Compression Pressure | 111 lbs. |



# PASSENGER CAR

| MAKE AND MODEL          |         | No. of Cylinders and Bore and Stroke | VALVES                                  |  | Operating Tappet Clearance | Rods Removed from | IGNITION   |         |                |      | Capacity Crank Case (Qts.) | Capacity Cooling System (Qts.) | Compression Pressure at Cranking Speed (Lbs.) (Standard Head) | CRANK-PIN |        | FRONT AXLE       |                  |                 |                               |                       |             |                 |
|-------------------------|---------|--------------------------------------|---|--|----------------------------|-------------------|------------|---------|----------------|------|----------------------------|--------------------------------|---|-----------|--------|------------------|------------------|-----------------|-------------------------------|-----------------------|-------------|-----------------|
|                         |         |                                      | Inlet Tapped Clearance for Valve Timing | Intake Valve Opens Deg. Before or After TC |                            |                   | Spark Plug |         | Timing         |      |                            |                                |   | Diameter  | Length | Caster (Degrees) | Camber (Degrees) | Toe-in (Inches) | Kingpin Inclination (Degrees) |                       |             |                 |
|                         |         |                                      |   |  |                            |                   | Intake     | Exhaust | Make and Model | Gap  |                            |                                |   |           |        |                  |                  |                 |                               | Spark Occurs—No. Deg. | Breaker Gap | Breaker Housing |
|                         |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| BANTAM                  |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| 37-40                   | 1938    | 4-2.2x3                              | .006                                    | 19B  | .006                       | .006              | A          | A-A9    | .025 2B        | .022 | Au                         | 3                              | 7   | 90        | 1 1/8  | 1 1/4            | 11               | 1/2             | 1/8-1/8                       | 0                     |             |                 |
| 60                      | 1939    | 4-2.2x3                              | .011                                    | 19B  | .011H                      | .012H             | A          | A-A9    | .025 TC        | .022 | Au                         | 3                              | 4   | 125       | 1 1/8  | 1 1/4            | 11               | 1/2             | 1/8-1/8                       | 1 1/2                 |             |                 |
| 65                      | 1940    | 4-2.26x3.12                          | .011                                    | 19B  | .011H                      | .012H             | A          | Ch-H10  | .025 4B        | .022 | Au                         | 3                              | 5 1/2   | 135       | 1 1/4  | 1                | 15               | 1/2             | 1/8-1/8                       | 1 1/2                 |             |                 |
| 65                      | 1941    | 4-2.26x3.12                          | .011                                    | 19B  | .011H                      | .012H             | A          | Ch-H10  | .025 4B        | .022 | Au                         | 3                              | 5 1/2   | 135       | 1 1/4  | 1                | 15               | 1/2             | 1/8-1/8                       | 1 1/2                 |             |                 |
| BUICK                   |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| 37-40                   | 1937    | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-H9   | .024 2B        | .015 | Au                         | 6                              | 13 1/4  | 120+      | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 60, 80, 90              | 1937    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-H9   | .024 10B       | .015 | Au                         | 8                              | 17  | 119+      | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 40                      | 1938-39 | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-46   | .025 4B        | .015 | Au                         | 6                              | 13 1/4  | 112       | 2 1/4  | 1.21             | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 60, 80, 90              | 1938-39 | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-46   | .025 6B        | .015 | Au                         | 8                              | 17  | 114       | 2 1/4  | 1.31             | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | F           |                 |
| 40, 50                  | 1940    | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-46   | .025 4B        | .015 | Au                         | 8                              | 12 1/2  | 112       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 60, 70                  | 1940    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-46   | .025 6B        | .015 | Au                         | 10                             | 16  | 114       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 80, 90                  | 1940    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-46   | .025 6B        | .015 | Au                         | 10                             | 16  | 114       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1P                      | 0-1/4                 | 4-5         |                 |
| 40, 50                  | 1941    | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-104  | .027 2B        | .015 | Au                         | 6                              | 13  | 142       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P                 | 0-1/4                 | 3 1/2       |                 |
| 60, 70                  | 1941    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-104  | .027 6B        | .015 | Au                         | 8                              | 16 1/2  | 151       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P                 | 0-1/4                 | 3 1/2       |                 |
| 90                      | 1941    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-104  | .027 6B        | .015 | Au                         | 8                              | 19  | 151       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P                 | 0-1/4                 | 3 1/2       |                 |
| 40                      | 1942    | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-46   | .025 4B        | .015 | Au                         | 6                              | 13  | 112       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P                 | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 50                      | 1942    | 8-3 1/2 x 4 1/2                      | ++                                      | 13B  | .015H                      | .015H             | A          | AC-46   | .025 6B        | .015 | Au                         | 6                              | 13  | 115       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P                 | 0-1/4                 | 3 1/2-4 1/2 |                 |
| 60, 70, 90              | 1942    | 8-3 1/2 x 4 1/2                      | ++                                      | 14B  | .015H                      | .015H             | A          | AC-46   | .025 6B        | .015 | Au                         | 6                              | 13  | 115       | 2 1/4  | 1 1/8            | 1 1/2            | 1/2 N-3/4 P     | 1/2 N-1 1/2 P*                | 0-1/4                 | 3 1/2-4 1/2 |                 |
| CADILLAC                |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| V8-60                   | 1937    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-K7   | .027 5B        | .015 | Au                         | 7                              | 25  | 155+      | 2 1/8  | 1 1/8            | 1/4-1            | 1/4-1           | 1/4-1                         | 4°-51'                |             |                 |
| V8-65, 70, 75           | 1937    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-K7   | .027 5B        | .015 | Au                         | 7                              | 25  | 170+      | 2 1/8  | 1 1/8            | 0-1/4            | 0-1/4           | 0-1/4                         | 5°-38'                |             |                 |
| V12-85                  | 1937    | 12-3 1/2 x 4 1/2                     | .000                                    | TC   | AA                         | AA                | B          | AC-G7   | .025 10B       | .021 | Au                         | 9                              | 17  | 145+      | 2 1/8  | 1 1/8            | 0-1/4            | 0-1/4           | 0-1/4                         | 5°-38'                |             |                 |
| V16-90                  | 1937    | 16-3 1/2 x 4 1/2                     | .000                                    | TC   | AA                         | AA                | B          | AC-G6   | .025 4B        | .016 | Au                         | 10                             | 24  | 154+      | 2 1/8  | 1 1/8            | 0-1/4            | 0-1/4           | 0-1/4                         | 4°-51'                |             |                 |
| V8-60, 60S              | 1938    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-45   | .027 5B        | .015 | A                          | 7                              | 24  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-0          | 1/4-1           | 1/4-1                         | 4°-51'                |             |                 |
| V-65                    | 1938    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-45   | .027 5B        | .015 | A                          | 7                              | 25  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| V8-75                   | 1938    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-45   | .027 5B        | .015 | A                          | 7                              | 25  | 170+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| V16-90                  | 1938    | 16-3 1/2 x 4 1/2                     | .000                                    | TC   | AA                         | AA                | A          | AC-45   | .027 6B        | .015 | A                          | 11                             | 30  | 180+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| V8-61, 60S              | 1939    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 5B        | .015 | A                          | 7                              | 25  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| V8-75                   | 1939    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 5B        | .015 | A                          | 7                              | 25  | 170+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| V16-90                  | 1939    | 16-3 1/2 x 4 1/2                     | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 6B        | .015 | A                          | 11                             | 30  | 180+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| 40-60S, 62-V8           | 1940    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 5B        | .015 | Au                         | 7                              | 24 1/2  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| 40-72, 75-V8            | 1940    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 5B        | .015 | Au                         | 7                              | 24 1/2  | 170+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| 40-90-V16               | 1940    | 16-3 1/2 x 4 1/2                     | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 6B        | .015 | Au                         | 11                             | 30  | 180+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-38'                |             |                 |
| 61, 62, 63, 60S, 67, 75 | 1941    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .027 5B        | .015 | Au                         | 7                              | 25  | 182       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-51'                |             |                 |
| All                     | 1942    | 8-3 1/2 x 4 1/2                      | .000                                    | TC   | AA                         | AA                | A          | AC-104  | .030 5B        | .015 | Au                         | 7                              | 25  | 100       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 5°-51'                |             |                 |
| CHEVROLET               |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| GA, GB                  | 1937    | 6-3 1/2 x 3 1/2                      | .006                                    | 9B   | .006H                      | .013H             | A          | AC-K11  | .040 5B        | .020 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| HA, HB                  | 1938    | 6-3 1/2 x 3 1/2                      | .006                                    | 9B   | .006H                      | .013H             | A          | AC-46   | .040 5B        | .021 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Master 85               | 1939    | 6-3 1/2 x 3 1/2                      | .006                                    | 9B   | .006H                      | .013H             | A          | AC-46   | .040 5B        | .021 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Master Deluxe           | 1939    | 6-3 1/2 x 3 1/2                      | .006                                    | 9B   | .006H                      | .013H             | A          | AC-46   | .040 5B        | .021 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Master 85               | 1940    | 6-3 1/2 x 3 1/2                      | .006                                    | 3B   | .006H                      | .013H             | A          | AC-44   | .040 5B        | .021 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| DL & MDL                | 1940    | 6-3 1/2 x 3 1/2                      | .006                                    | 3B   | .006H                      | .013H             | A          | AC-44   | .040 5B        | .021 | Au                         | 5                              | 14  | 112       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
|                         | 1941-42 | 6-3 1/2 x 3 1/2                      | .006                                    | 3B   | .006H                      | .013H             | A          | AC-104  | .040 5B        | .018 | Au                         | 5                              | 14  | 110       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| CHRYSLER                |         |                                      |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |
| C16-Royal               | 1937    | 6-3 1/2 x 4 1/2                      | .014                                    | TC   | .008H                      | .010H             | A          | Ch-J8   | .025 2A        | .020 | Au                         | 5                              | 20  | 110       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C14-Imperial            | 1937    | 6-3 1/2 x 4 1/2                      | .011                                    | 2B   | .006H                      | .010H             | A          | Ch-H10  | .025 3A        | .018 | Au                         | 6                              | 22  | 110       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C15-Custom Imp.         | 1937    | 8-3 1/2 x 4 1/2                      | .011                                    | 2B   | .006H                      | .010H             | A          | Ch-H10  | .025 5A        | .018 | Au                         | 6                              | 21  | 110       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C17-Airflow             | 1937    | 8-3 1/2 x 4 1/2                      | .011                                    | 2B   | .006H                      | .010H             | A          | Ch-H10  | .025 5A        | .018 | Au                         | 6                              | 18  | 110       | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C18-Royal               | 1938    | 6-3 1/2 x 4 1/2                      | .014                                    | 8B   | .008H                      | .010H             | A          | Ch-J8   | .025 TC        | .020 | Au                         | 5                              | 20  | 145+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C19-Imperial            | 1938    | 8-3 1/2 x 4 1/2                      | .011                                    | 2B   | .006H                      | .010H             | A          | Ch-J8   | .025 3B        | .018 | Au                         | 6                              | 20  | 145+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C20-Cust. Imp.          | 1938    | 8-3 1/2 x 4 1/2                      | .011                                    | 2B   | .006H                      | .010H             | A          | Ch-H10  | .025 TC        | .018 | Au                         | 6                              | 20  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C22-Royal               | 1939    | 6-3 1/2 x 4 1/2                      | .014                                    | 8B   | .008H                      | .010H             | A          | A-A7    | .025 TC        | .020 | Au                         | 5                              | 17  | 145+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C23                     | 1939    | 8-3 1/2 x 4 1/2                      | .011                                    | 6B   | .008H                      | .010H             | A          | A-A7    | .025 TC        | .018 | Au                         | 6                              | 24  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| C24-Cust. Imp.          | 1939    | 8-3 1/2 x 4 1/2                      | .011                                    | 6B   | .008H                      | .010H             | A          | A-AL6   | .025 3B        | .018 | Au                         | 6                              | 24  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Winds. & Royal C25      | 1940    | 8-3 1/2 x 4 1/2                      | .014                                    | 12B  | .008H                      | .010H             | A          | AL-A7B  | .025 TC        | .020 | Au                         | 5                              | 18  | 145+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Saratoga & N. Y. C25    | 1940    | 8-3 1/2 x 4 1/2                      | .011                                    | 6B   | .008H                      | .010H             | A          | AL-A7B  | .025 TC        | .017 | Au                         | 6                              | 24  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Crown Imp. C27          | 1940    | 8-3 1/2 x 4 1/2                      | .011                                    | 6B   | .008H                      | .010H             | A          | AL-7B   | .025 3B        | .017 | Au                         | 6                              | 24  | 155+      | 2 1/8  | 1 1/8            | 1/4 N-1/4 P      | 0-1/2           | 0-1/2                         | 4°-6                  |             |                 |
| Royal & Windsor         | 1941    | 8-3 1/2 x 4                          |   |  |                            |                   |            |         |                |      |                            |                                |   |           |        |                  |                  |                 |                               |                       |             |                 |

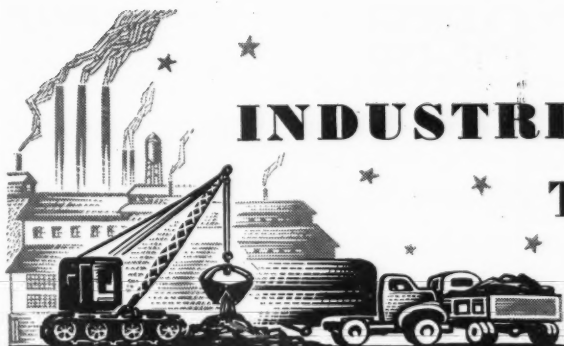
# TUNE-UP SPECIFICATIONS

(1937 to 1942 Inclusive)

| MAKE<br>AND<br>MODEL  |            | No. of<br>Cylinders<br>and<br>Bore and<br>Stroke | VALVES   |   |                                  |         | Rods<br>Removed from | IGNITION   |                   |         |                             | Capacity<br>Crank Case (Qts.) | Capacity<br>Cooling System (Qts.) | Compression<br>Pressure at Cranking<br>Speed (Lbs.) (Standard Head) | CRANK-<br>PIN |        | FRONT AXLE          |                     |                    |                                     |                |                    |
|-----------------------|------------|--|--|---|----------------------------------|---------|----------------------|------------|-------------------|---------|-----------------------------|-------------------------------|-----------------------------------|---|---------------|--------|---------------------|---------------------|--------------------|-------------------------------------|----------------|--------------------|
|                       |            |  | Inlet Tapped<br>Clearance<br>for Valve<br>Timing | Intake Valve<br>Opens Deg.<br>Before or<br>After TC | Operating<br>Tappet<br>Clearance |         |                      | Spark Plug | Timing            |         |                             |                               |                                   |   | Diameter      | Length | Caster<br>(Degrees) | Camber<br>(Degrees) | Toe-in<br>(Inches) | Kingpin<br>Inclination<br>(Degrees) |                |                    |
|                       |            |  |  |   | Intake                           | Exhaust |                      |            | Make and<br>Model | Gap     | Spark<br>Occurs<br>No. Deg. |                               |                                   |   |               |        |                     |                     |                    |                                     | Breaker<br>Gap | Breaker<br>Housing |
|                       |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| FORD                  |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| 74-V8 (60 Hp.)        | 1937       | 8-2.6x3.2  | .013   | 9 1/2 B   | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 4                                 | 15  | 105           | 1.60   | 1.54                | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| 78-V8 (85 Hp.)        | 1937       | 8-3 1/4 x 3 3/4                                  | .013   | TC  | .013C                            | .013C   | A                    | Ch-18      | .025              | 4B      | .015                        | Au                            | 5                                 | 22  | 100           | 2      | 1 1/2               | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| 82A-V8 (60 Hp.)       | 1938       | 8-2.6x3.2  | .013   | 9 1/2 B   | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 4                                 | 15  | 105           | 1.60   | 1.54                | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| 81A-V8 (85 Hp.)       | 1938       | 8-3 1/4 x 3 3/4                                  | .013   | TC  | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 5                                 | 22  | 100           | 2      | 1 1/2               | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| 922A-V8 (60 Hp.)      | 1939       | 8-2.6x3.2  | .013   | 9 1/2 B   | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 4                                 | 15  | 105           | 1.60   | 1.54                | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| 91A-V8 (85 Hp.)       | 1939       | 8-3 1/4 x 3 3/4                                  | .013   | TC  | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 5                                 | R   | 100           | 2      | 1 1/2               | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| V8-60                 | 1940       | 8-2.6x3.2  | .013   | 9 1/2 B   | .013C                            | .013C   | A                    | Ch-J10     | .025              | 4B      | .015                        | Au                            | 4                                 | 13  | 105           | 1.70   | 1.41                | 8                   | 1                  | 1 1/8                               | 8              |                    |
| V8-85                 | 1940       | 8-3 1/4 x 3 3/4                                  | .013   | TC  | .013C                            | .013C   | A                    | Ch-J10     | .025              | 4B      | .015                        | Au                            | 5                                 | 22  | 100           | 2      | 1.75                | 8                   | 1                  | 1 1/8                               | 8              |                    |
| Deluxe & Super        | 1941       | 8-3.06x3.75                                      | TC   | .011C   | .011C                            | .011C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 5                                 | 23 3/4  | 140           | 1.99   | 1.75                | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| V-8                   | 1942       | 8-3.06x3.75                                      | TC   | .012C   | .015C                            | .015C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 5                                 | 22  | 110           | 2.0    | 1.75                | 8                   | 1                  | 1 1/8                               | 8              |                    |
| 6                     | 1942       | 6-3.30x4.40                                      | 3B   | .013C   | .013C                            | .013C   | A                    |            | .032              | 2B      | .015                        | Au                            | 5                                 |   | 117           | 2.235  | 1.4                 | 8                   | 1                  | 1 1/8                               | 8              |                    |
| GRAHAM                |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| 85                    | 1937       | 6-3x4  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-7       | .025              | 2B      | .018                        | Au                            | 5                                 | 11  | 115           | 1 1/2  | 1 1/2               | 4 1/2-5 1/2         | 1                  | 1 1/8                               | 7 1/2          |                    |
| 95                    | 1937       | 6-3 1/4 x 4                                      | .012   | 2A  | .010H                            | .010H   | A                    | Ch-J9      | .025              | TC      | .018                        | Au                            | 5                                 | 15  | 114           | 2 1/2  | 1 1/2               | 4-4 1/2             | 1                  | 1 1/8                               | 7 1/2          |                    |
| 116-Super Ch.         | 1937       | 6-3 1/4 x 4                                      | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-H10     | .025              | 4A      | .018                        | Au                            | 5                                 | 15  | 114           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| 120-Super Ch.         | 1937       | 6-3 1/4 x 4 1/2                                  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-H10     | .025              | 4A      | .018                        | Au                            | 5                                 | 15  | 114           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| 96-Stand. & Spec.     | 1938       | 6-3 1/4 x 4 1/2                                  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-J9      | .025              | 4B      | .018                        | Au                            | 5                                 | 15  | 160 1/2       | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| 97-SC. & Cust. SC.    | 1938       | 6-3 1/4 x 4 1/2                                  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-J9      | .025              | 4B      | .018                        | Au                            | 5                                 | 15 1/2  | 120           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| 96-Spec. & Cust.      | 1939       | 6-3 1/4 x 4 1/2                                  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-H10     | .025              | TC      | .018                        | Au                            | 5                                 | 14  | 120           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| 97-SC. & Cust. SC.    | 1939       | 6-3 1/4 x 4 1/2                                  | .012   | 4 1/2 B   | .010H                            | .010H   | A                    | Ch-H10     | .025              | 4 1/2 A | .018                        | Au                            | 5                                 | 15  | 130           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| DeL. & Cust.          | 1940       | 6-3 1/4 x 4 1/2                                  | .010   | 8 1/2 B   | .010H                            | .010H   | A                    | Ch-J10     | .025              | TC      | .018                        | Au                            | 5                                 | 14  | 125           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| SC. & Cust. SC.       | 1940       | 6-3 1/4 x 4 1/2                                  | .010   | 8 1/2 B   | .010H                            | .010H   | A                    | Ch-J10     | .025              | 4 1/2 B | .018                        | Au                            | 5                                 | 15  | 130           | 2 1/2  | 1 1/2               | 3-4                 | 1                  | 1 1/8                               | 7 1/2          |                    |
| HUDSON                |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| 73                    | 1937       | 6-3x5  | .008   | 10 1/2 B  | .008H                            | .010H   | A                    | Ch-J8      | .025              | TC      | .020                        | Au                            | 5                                 | 20  | 80            | 1 1/2  | 1 1/2               | 0-1 1/2             | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 74-5-6-7              | 1937       | 6-3x4 1/2  | .008   | 10 1/2 B  | .008H                            | .010H   | BA                   | Ch-J8      | .025              | TC      | .020                        | Au                            | 7                                 | 20  | 80            | 1 1/2  | 1 1/2               | 0-1 1/2             | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 89 (112)              | 1938       | 6-3x4 1/2  | .006   | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 6                                 | 12 1/2  | 115           | 1 1/2  | 1 1/2               | 2-3                 | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 83                    | 1938       | 6-3x5  | .006   | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 6                                 | 12 1/2  | 120           | 1 1/2  | 1 1/2               | 2-3                 | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 84-5-7                | 1938       | 6-3x4 1/2  | .006   | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .017                        | Au                            | 9                                 | 17 1/2  | 118           | 1 1/2  | 1 1/2               | 2-3                 | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 90-98 (112)           | 1939       | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | D       | .020                        | Au                            | 6                                 | 12 1/2  | 115           | 1 1/2  | 1 1/2               | 1 1/2+1 1/2         | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 92-93                 | 1939       | 6-3x5  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 6                                 | 12 1/2  | 120           | 1 1/2  | 1 1/2               | 1 1/2+1 1/2         | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| 95-97                 | 1939       | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .017                        | Au                            | 9                                 | 17  | 118           | 1 1/2  | 1 1/2               | 1 1/2+1 1/2         | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| Six & DeL. 6          | 1940       | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 6                                 | 13  | 125           | 1 1/2  | 1 1/2               | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Super & CC 6          | 1940       | 6-3x5  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 6                                 | 13  | 120           | 1 1/2  | 1 1/2               | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Eight & CC 8          | 1940       | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J8A     | .032              | TC      | .017                        | Au                            | 9                                 | 18  | 119           | 1 1/2  | 1 1/2               | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Series 10, 20         | 1941-42    | 6-3x4 1/2  |  | 10 1/2 B**  | .006H**                          | .008H** | A                    | Ch-J9      | .038              | TC**    | .020                        | Au                            | 6                                 | 13  | 125           | 1.94   | 1.37                | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Series 11, 12, 21, 22 | 1941-42    | 6-3x5  |  | 10 1/2 B**  | .006H                            | .008H   | A                    | Ch-J9      | .038              | TC**    | .020                        | Au                            | 6                                 | 13  | 120           | 1.94   | 1.37                | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Series 14, 24, 25     | 1941-42    | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J9      | .038              | TC      | .017                        | Au                            | 9                                 | 18  | 119           | 1.94   | 1.37                | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Series 17, 27         | 1941-42    | 6-3x4 1/2  |  | 10 1/2 B  | .006H                            | .008H   | A                    | Ch-J9      | .038              | TC      | .017                        | Au                            | 9                                 | 18  | 119           | 1.94   | 1.37                | 0-1 1/2             | 1 1/2+1 1/2        | 1 1/2+1 1/2                         | 3 3/8'         |                    |
| Terraplane 81-82      | 1938       | 6-3x5  |  | 10 1/2 B  | .006                             | .008    | A                    | Ch-J8A     | .032              | TC      | .020                        | Au                            | 4 1/2                             | 12 1/2  | 120           | 1 1/2  | 1 1/2               | 2-3                 | 1-1 1/2            | 0-1 1/2                             | 7              |                    |
| LA SALLE              |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| V8 37-50              | 1937       | 8-3 3/8 x 4 1/2                                  | .000   | TC  | .000                             | .000    | A                    | AC-K7      | .026              | 5B      | .015                        | Au                            | 7                                 | 25  | 105           | 2 1/2  | 2 1/2               | 1 1/2-1             | 1 1/2-1            | 3 1/2-3 1/2                         | 4'51"          |                    |
| V8 38-50              | 1938       | 8-3 3/8 x 4 1/2                                  | AA   | TC  | AA                               | AA      | A                    | AC-45      | .027              | 5B      | .015                        | Au                            | 7                                 | 25  | 155 1/2       | 2 1/2  | 2 1/2               | 1 1/2 N-0           | 1 1/2-1            | 3 1/2-3 1/2                         | 4'51"          |                    |
| V8 39-50              | 1939       | 8-3 3/8 x 4 1/2                                  | AA   | TC  | AA                               | AA      | A                    | AC-104     | .027              | 5B      | .015                        | Au                            | 7                                 | 25  | 155 1/2       | 2 1/2  | 2 1/2               | 1 1/2 N-2 1/2       | 1 1/2-1            | 3 1/2-3 1/2                         | 5'6"           |                    |
| 40-50, 52             | 1940       | 8-3 3/8 x 4 1/2                                  | AA   | TC  | AA                               | AA      | A                    | AC-104     | .027              | 5B      | .015                        | Au                            | 7                                 | 25  | 155 1/2       | 2 1/2  | 2 1/2               | N1 1/2-N2 1/2       | 1 1/2-1            | 3 1/2-3 1/2                         | 5'6"           |                    |
| LINCOLN               |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| 351                   | 1937       | 12-3 1/2 x 4 1/2                                 | AA   | CSM   | AA                               | AA      | B                    | Ch-7       | .025              | TC      | .020                        | Au                            | 12                                | 32  | 109           | 2 1/2  | 2                   | 8                   | 1                  | 1 1/2-1 1/2                         | 7 1/2          |                    |
| 401 to 425            | 1938-39-40 | 12-3 1/2 x 4 1/2                                 | AA   | 21B   | AA                               | AA      | B                    | Ch-7       | .029              | 7B      | .020                        | Au                            | 12                                | 32  | 105           | 2 1/2  | 2                   | 1 1/2               | 1                  | 1 1/2-1 1/2                         | 7 1/2          |                    |
| Zephyr 900            | 1936       | 12-2 1/2 x 3 1/2                                 | .013   | 19 1/2 B  | .013C                            | .013C   | A                    | Ch-J9      | .025              | 4B      | .015                        | Au                            | 6                                 | 27  | 105           | 2 1/2  | 1.75                | 4 1/2-9             | 1 1/4-3/4          | 1 1/8                               | 8-8 1/4        |                    |
| Zephyr HB             | 1937       | 12-2 1/2 x 3 1/2                                 | .013   | 19 1/2 B  | .013C                            | .013C   | A                    | Ch-J9      | .029              | 4B      | .015                        | Au                            | 6                                 | 27  | 105           | 2 1/2  | 1.75                | 1 1/2-6             | 1 1/4-3/4          | 1 1/8                               | 3 3/4-4        |                    |
| Zephyr 700, 96H       | 1938-39    | 12-2 1/2 x 3 1/2                                 | AA   | 10.4  | AA                               | AA      | A                    | Ch-H10     | .029              | 4B      | .015                        | Au                            | 5                                 | 30  | 105           | 2 1/2  | 1.75                | 1 1/2-6             | 1 1/4-3/4          | 1 1/8                               | 3 3/4-4        |                    |
| Zephyr V12            | 1940       | 12-2 1/2 x 3 1/2                                 | AA   | 21B   | AA                               | AA      | A                    | Ch-H10     | .029              | 4B      | .015                        | Au                            | 5                                 | 27  | 105           | 2 1/2  | 1.57                | 4                   | 1 1/4              | 1 1/8                               | 7              |                    |
| Zephyr & Cont.        | 1941       | 12-2.87x3.7                                      | HA   | 10 1/2 B  | HA                               | HA      | A                    | Ch-H10     | .029              | 4B      | .015                        | Au                            | 5                                 | 27  |               | 2.13   | 1.75                | 3-5                 | 1 1/4-3/4          | 1 1/8                               | 3 3/4-4 1/4    |                    |
| Custom                | 1941       | 12-2.87x3.7                                      | HA   | 10 1/2 B  | HA                               | HA      | A                    | Ch-H10     | .029              | 4B      | .015                        | Au                            | 5                                 | 27  |               | 2.13   | 1.75                | 3-5                 | 1 1/4-3/4          | 1 1/8                               | 3 3/4-4 1/4    |                    |
| Zephyr, All           | 1942       | 12-2.93x3.75                                     | HA   | 10 1/2 B  | HA                               | HA      | A                    | Ch-H10     | .029              | 4B      | .015                        | Au                            | 5                                 | 27  | 125           | 2.13   | 1.75                | 3-5                 | 1 1/4-3/4          | 1 1/8                               | 3 3/4-4 1/4    |                    |
| MERCURY               |            |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |
| 99A                   | 1939       | 8-3 1/4 x 3 3/4                                  | .013   | TC  | .013C                            | .013C   | A                    | Ch-H10     | .025              | 4B      | .015                        | Au                            | 5                                 | 21  | 100           | 2 1/2  | 1 1/2               | 4 1/2-9             | 1 1/4-1            | 1 1/8                               | 8              |                    |
| U8                    | 1940       |  |  |   |                                  |         |                      |            |                   |         |                             |                               |                                   |   |               |        |                     |                     |                    |                                     |                |                    |

# Passenger Car Tune-Up Specifications—Continued

| MAKE AND MODEL          |         | No. of Cylinders and Bore and Stroke | VALVES                                  |  |                            |         | Rods Removed from | IGNITION   |                |       |                       | Capacity Crank Case (Qts.) | Capacity Cooling System (Qts.) | Compression Pressure at Cranking Speed (Lbs.) (Standard Head) | CRANK-PIN |        | FRONT AXLE       |                  |                 |                               |             |                 |
|-------------------------|---------|--------------------------------------|---|--|----------------------------|---------|-------------------|------------|----------------|-------|-----------------------|----------------------------|--------------------------------|---|-----------|--------|------------------|------------------|-----------------|-------------------------------|-------------|-----------------|
|                         |         |                                      | Inlet Tapped Clearance for Valve Timing | Intake Valve Opens Deg. Before or After TC | Operating Tappet Clearance |         |                   | Spark Plug | Timing         |       |                       |                            |                                |   | Diameter  | Length | Caster (Degrees) | Camber (Degrees) | Toe-in (Inches) | Kingpin Inclination (Degrees) |             |                 |
|                         |         |                                      |   |  | Intake                     | Exhaust |                   |            | Make and Model | Gap   | Spark Occurs—No. Deg. |                            |                                |   |           |        |                  |                  |                 |                               | Breaker Gap | Breaker Housing |
|                         |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| OLDSMOBILE              |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| F-37                    | 1937    | 6-3 1/4 x 4 1/4                      | .0125                                   | 5B   | .008H                      | .011H   | A                 | AC-K9      | .040           | TC    | .020                  | Au                         | 6                              | 16  | 101       | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| L-37                    | 1937    | 8-3 1/4 x 3 3/4                      | .0125                                   | TC   | .008H                      | .011H   | A                 | AC-K9      | .030           | 2B    | .015                  | Au                         | 7                              | 20  | 103       | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| F-38                    | 1938    | 6-3 1/4 x 4 1/4                      | .0125                                   | 5B   | .008H                      | .011H   | A                 | AC-45      | .040           | TC    | .020                  | Au                         | 6                              | 17  | 146+      | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| L-38                    | 1938    | 8-3 1/4 x 3 3/4                      | .0125                                   | TC   | .008H                      | .011H   | A                 | AC-45      | .030           | 2B    | .015                  | Au                         | 7                              | 21  | 152+      | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| 60                      | 1939    | 6-3 1/4 x 3 3/4                      | .011                                    | 5B   | .008H                      | .011H   | A                 | AC-45      | .040           | TC    | .020                  | Au                         | 5                              | 17  | 151+      | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| 70                      | 1939    | 6-3 1/4 x 4 1/4                      | .011                                    | 5B   | .008H                      | .011H   | A                 | AC-45      | .040           | TC    | .020                  | Au                         | 5                              | 17  | 146+      | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| 80                      | 1939    | 8-3 1/4 x 3 3/4                      | .011                                    | TC   | .008H                      | .011H   | A                 | AC-45      | .030           | 2B    | .015                  | Au                         | 24                             | 152+  | 146+      | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 1/2           |
| 6-60                    | 1940    | 6-3 1/4 x 4 1/4                      | .012                                    | 5B   | .008H                      | .011H   | A                 | AC-45      | .040           | TC    | .020                  | Au                         | 5                              | 17 3/4  | 146+      | 2 1/8  | 1 3/8            | 0-N 3/4          | N 1/4-1 1/2     | 1/8-1/8                       | 4 51/16     |                 |
| 6-70                    | 1940    | 6-3 1/4 x 4 1/4                      | .012                                    | 5B   | .008H                      | .011H   | A                 | AC-45      | .040           | TC    | .020                  | Au                         | 5                              | 17 3/4  | 146+      | 2 1/8  | 1 3/8            | 0-N 3/4          | N 1/4-1 1/2     | 1/8-1/8                       | 4 51/16     |                 |
| Cust. & Cruiser         | 1940    | 8-3 1/4 x 3 3/4                      | .012                                    | TC   | .008H                      | .011H   | A                 | AC-45      | .030           | 2B    | .015                  | Au                         | 6                              | 21  | 152       | 2 1/8  | 1 3/8            | 0-N 3/4          | N 1/4-1 1/2     | 1/8-1/8                       | 4 51/16     |                 |
| 6                       | 1941-42 | 6-3 1/4 x 4 1/4                      | .012                                    | 5B   | .008H                      | .011H   | A                 | AC-44      | .040           | TC    | .021                  | Au                         | 5                              | 18  | 115-110   | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 51/16         |
| 8                       | 1941-42 | 8-3 1/4 x 3 3/4                      | .012                                    | TC   | .008H                      | .011H   | A                 | AC-44      | .030           | 2B    | .015                  | Au                         | 6                              | 22-12   | 107-111   | 2 1/8  | 1 3/8            | 0-3/4            | N               | 1/4-1                         | 1/8-3/8     | 4 51/16         |
| OVERLAND                |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| 39                      | 1939    | 4-3 1/4 x 4 3/8                      | .020                                    | 9B   | .014C                      | .014C   | A                 | Ch-J8      | .025           | TC    | .020                  | Au                         | 4                              | 11 3/4  | 105       | 1 1/8  | 1 1/8            | 3                | 2               | 1/8-1/8                       | 7 1/2       |                 |
| PACKARD                 |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| 115C                    | 1937    | 6-3 1/4 x 4 1/4                      |   | 5B   | .007H                      | .010H   | A                 | AC-Y4      | .028           | 4B    | .015                  | Au                         | 7                              | 17  | 105       | 2 3/8  | 1 1/4            | 2 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 120C                    | 1937    | 8-3 1/4 x 4 1/4                      |   | 5B   | .007H                      | .010H   | A                 | AC-Y4      | .028           | 7B    | .015                  | Au                         | 7                              | 20  | 110       | 2 3/8  | 1 1/4            | 2 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1500, 1, 2-Super 8      | 1937    | 8-3 1/4 x 5                          |   | 30B  | .004H                      | .006H   | (r)               | AC-Y4      | .028           | 6B    | .015                  | Au                         | 8                              | 24  | 108       | 2 3/8  | 1 1/4            | 2 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1506, 7, 8-V12          | 1937    | 12-3 1/4 x 4 1/4                     | .000                                    | TC   | AA                         | AA      | (r)               | AC-Y4      | .028           | 6B    | .020                  | Au                         | 10                             | 40  | 108       | 2 3/8  | 1 1/4            | 0-1/2            | N               | 1/4-1                         | 1/8-3/8     | 1 1/2           |
| 1600                    | 1938    | 6-3 1/4 x 4 1/4                      |   | 1B   | .007H                      | .010H   | A                 | Ch-Y4      | .028           | 6B    | .020                  | Au                         | 6                              | 15  | 110       | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1601, 2                 | 1938    | 8-3 1/4 x 4 1/4                      |   | 1B   | .007H                      | .010H   | A                 | Ch-Y4      | .028           | 6B    | .015                  | Au                         | 6                              | 16  | 110       | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1603, 4, 5-Super 8      | 1938    | 8-3 1/4 x 5                          |   | 30B  | .006H                      | .008H   | (r)               | Ch-Y4      | .028           | 6B    | .015                  | Au                         | 8                              | 20  | 110       | 2 3/8  | 1 1/4            | 2 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1607, 8; 1706, 7, 8     | 1938-39 | 12-3 1/4 x 4 1/4                     |   | TC   | AA                         | AA      | (r)               | Ch-Y4      | .028           | 6B    | .020                  | Au                         | 10                             | 40  | 110       | 2 3/8  | 1 1/4            | 0-1/2            | N               | 1/4-1                         | 1/8-3/8     | 1 1/2           |
| 1700                    | 1939    | 6-3 1/4 x 4 1/4                      | .0125                                   | 1B   | .007H                      | .010H   | A                 | Ch-Y4      | .028           | 6B    | .020                  | Au                         | 5                              | 15.2  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1701, 2                 | 1939    | 8-3 1/4 x 4 1/4                      | .0125                                   | 1B   | .007H                      | .010H   | A                 | Ch-Y4      | .028           | 6B    | .015                  | Au                         | 6                              | 16  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1703, 5                 | 1939    | 8-3 1/4 x 5                          | .005                                    | 26B  | .006H                      | .008H   |                   | Ch-Y4      | .028           | 7B    | .015                  | Au                         | 7 1/2                          | 22  |           | 2 3/8  | 1 1/4            | 0-1/2            | N               | 1/4-1                         | 1/8-3/8     | 1 1/2           |
| 1800, 6                 | 1940    | 6-3 1/4 x 4 1/4                      | .012                                    | 1B   | .007H                      | .010H   | A                 | AC-1042    | .028           | 6B    | .020                  | Au                         | 5                              | 17  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1801, 8                 | 1940    | 8-3 1/4 x 4 1/4                      | .012                                    | 1B   | .007H                      | .010H   | A                 | AC-1042    | .028           | 6B    | .015                  | Au                         | 6                              | 18  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1803, 4, 5; Sup. 8      | 1940    | 8-3 1/4 x 4 1/4                      |   | AA   | AA                         | AA      |                   | AC-1042    | .028           | 5B    | .015                  | Au                         | 7                              | 20  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 1806, 7, 8; Cus. Sup. 8 | 1940    | 8-3 1/4 x 4 1/4                      |   | AA   | AA                         | AA      |                   | AC-1042    | .028           | 5B    | .015                  | Au                         | 7                              | 20  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 6                       | 1941-42 | 6-3 1/4 x 4 1/4                      | .012                                    | 1B   | .007H                      | .010H   | A                 | AC-13      | .028           | 6B-14 | .020                  | Au                         | 5                              | 15  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| 8                       | 1941-42 | 8-3 1/4 x 4 1/4                      | .012                                    | 1B   | .007H                      | .010H   | A                 | AC-13      | .028           | 7B-14 | .017                  | Au                         | 6                              | 17  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| Super 8                 | 1941-42 | 8-3 1/4 x 4 1/4                      |   | HA   | HA                         | HA      | A                 | AC-13      | .028           | 5B-14 | .017                  | Au                         | 7                              | 20  |           | 2 3/8  | 1 1/4            | 1 1/2            | 1 1/4           | 1 1/4                         | 1 1/4       | 1 1/2           |
| PLYMOUTH                |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| P3, P4                  | 1937    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | Ch-J8      | .025           | 4A    | .020                  | Au                         | 5                              | 15  | 114       | 1 1/8  | 1                | 1-3              | 1/4-3/4         | 0-1/8                         | 4 1/2-5 1/2 |                 |
| P5                      | 1938    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | Ch-J8      | .025           | 4A    | .020                  | Au                         | 5                              | 14  | 145+      | 1 1/8  | 1                | 3-5              | 1/4-3/4         | 0-1/8                         | 4 1/2-5 1/2 |                 |
| P6                      | 1938    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | A-A7       | .025           | 4A    | .020                  | Au                         | 5                              | 14  | 145+      | 1 1/8  | 1                | 1-3              | 1/4-3/4         | 0-1/8                         | 4 1/2-5 1/2 |                 |
| P7                      | 1936    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | Ch-J8      | .025           | TC    | .020                  | Au                         | 5                              | 14  | 145+      | 1 1/8  | 1                | 1-N-1 1/2P       | 1/4-3/4         | 0-1/8                         | 5 1/2-6 1/2 |                 |
| P8                      | 1939    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | A-A7       | .025           | TC    | .020                  | Au                         | 5                              | 14  | 145+      | 1 1/8  | 1                | 1-N-1 1/2P       | 1/4-3/4         | 0-1/8                         | 5 1/2-6 1/2 |                 |
| P9 Roadking             | 1940    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | AL-A7B     | .025           | TC    | .020                  | Au                         | 5                              | 14  | 150+      | 1 1/8  | 1                | N1-1 1/2         | 0-3/8           | 0-1/8                         | 4 1/2-6     |                 |
| P10 DeLuxe              | 1940    | 6-3 1/4 x 4 3/8                      | .011                                    | 6A   | .006H                      | .008H   | A                 | AL-A7B     | .025           | TC    | .020                  | Au                         | 5                              | 14  | 150+      | 1 1/8  | 1                | N1-1 1/2         | 0-3/8           | 0-1/8                         | 4 1/2-6     |                 |
| P11                     | 1941    | 6-3 1/4 x 4 3/8                      | .014                                    | 9B   | .008H                      | .010H   | A                 | AL-A7      | .025           | TC    | .020                  | Au                         | 5                              | 14  |           | 1 1/8  | 1                | 1N-1P            | 0-3/8           | 0-1/8                         | 4 1/2-6     |                 |
| Special Deluxe          | 1941    | 6-3 1/4 x 4 3/8                      | .014                                    | 9B   | .008H                      | .010H   | A                 | AL-A7      | .025           | TC    | .020                  | Au                         | 5                              | 14  |           | 1 1/8  | 1                | 1N-1P            | 0-3/8           | 0-1/8                         | 4 1/2-6     |                 |
| P14                     | 1942    | 6-3 1/4 x 4 3/8                      | .014                                    | 12B  | .008H                      | .010H   | A                 | AL-A7      | .025           | 3B    | .020                  | Au                         | 5                              | 15  | 125       | 2 1/8  | 1                | 1N-1P            | 0-3/8           | 0-1/8                         | 4 1/2-6     |                 |
| PONTIAC                 |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| 37-26CA                 | 1937    | 6-3 1/4 x 4                          | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-K7      | .025           | 4B    | .019                  | Au                         | 6                              | 16  | 103       | 2      | 1 1/8            | 1N-1 1/4N        | 3/4-1 1/4       | 0                             | 4 1/2-5     |                 |
| 37-28CA                 | 1937    | 8-3 1/4 x 3 3/4                      | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-K7      | .025           | 4B    | .016                  | Au                         | 7                              | 19  | 103       | 2      | 1 1/8            | 1N-1 1/4N        | 3/4-1 1/4       | 0                             | 4 1/2-5     |                 |
| 38-26DA                 | 1938    | 6-3 1/4 x 4                          | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .020                  | Au                         | 6                              | 16  | 141+      | 2      | 1 1/8            | 1N-1 1/4N        | 3/4-1 1/4       | 0                             | 4 1/2-5     |                 |
| 38-28DA, 39-28          | 1938-39 | 8-3 1/4 x 3 3/4                      | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .015                  | Au                         | 7                              | 19  | 141+      | 2      | 1 1/8            | 1N-1 1/4N        | 3/4-1 1/4       | 0                             | 4 1/2-5     |                 |
| 39-25, 39-26            | 1939    | 6-3 1/4 x 4                          | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .021                  | Au                         | 6                              | 17  | 141+      | 2 1/8  | 1 3/8            | 1N-1N            | 1/2-1           | 0-1/8                         | 4 1/2-5     |                 |
| 40-25, 26               | 1940    | 6-3 1/4 x 4                          | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .020                  | Au                         | 6                              | 17  | 156+      | 2 1/8  | 1 3/8            | N1-1N            | 1/2-1           | 0-1/8                         | 4 1/2-5     |                 |
| 40-28, 29               | 1940    | 8-3 1/4 x 3 3/4                      | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .015                  | Au                         | 6                              | 19  | 152+      | 2      | 1 1/8            | N1-1N            | 1/2-1           | 0-1/8                         | 4 1/2-5     |                 |
| 6                       | 1941-42 | 6-3 1/4 x 4                          | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .021                  | Au                         | 6                              | 18  |           | 2 1/8  | 1 3/8            | 1N-1N            | 0-1             | 0-1/8                         | 4 1/2-5     |                 |
| 8                       | 1941-42 | 8-3 1/4 x 3 3/4                      | .015                                    | 5B   | .012H                      | .012H   | A                 | AC-45      | .025           | 4B    | .015                  | Au                         | 6                              | 19 1/2  |           | 2      | 1 1/8            | 1/2N-1N          | 0               | 0-1/8                         | 4 1/2-5     |                 |
| STUDEBAKER              |         |                                      |   |  |                            |         |                   |            |                |       |                       |                            |                                |   |           |        |                  |                  |                 |                               |             |                 |
| 5A-Dictator             | 1937    | 6-3 1/4 x 4 3/8                      | .020                                    | 15B  | .016C                      | .016C   | A                 | Ch-8A      | .025           | 2B    | .020                  | Au                         | 5 1/2                          | 13  | 105       | 2 3/8  | 1 3/8            | 1 1/2            | 1 1/2           | 1 1/2                         | 1 1/2       | 5 1/2           |
| 6A-Dictator Pl.         | 1937    | 6-3 1/4 x 4 3/8                      | .020                                    | 15B  | .016C                      | .016C   | A                 | Ch-8A      | .025           | 2B    | .020                  | Au                         | 5 1/2                          | 13  | 105       | 2 3/8  | 1 3/8            | 1 1/2            | 1 1/2           | 1 1/2                         | 1 1/2       | 5 1/2           |
| 3C-President            | 1937    | 8-3 1/4 x 4 1/4                      | .020                                    | 15B  | .016C                      | .016C   | A                 | Ch-8A      | .025           | TC    | .020                  | Au                         | 8                              | 16  | 110       | 2 1/8  | 1 3/8            | 1 1/2            | 1 1/2           | 1 1/2                         | 1 1/2       | 5 1/2           |
| 7A, 8A-Com.             | 1938    | 6-3 1/4 x 4 3/8                      | .020                                    | 15B  | .016C                      | .016C   | A                 | Ch-8A      | .025           | 2B    | .020                  | Au                         | 5 1/2                          | 14 1/2  | 105       | 2 1/8  | 1 3/8            | 45               | 1 1/2           | 1 1/2                         | 1 1/2       | 5 1/td          |



# INDUSTRIAL and TRUCK ENGINE TUNE-UP DATA

| MAKE<br>AND MODEL  | Intake<br>Valve<br>Opens<br>B-Before<br>A-After |                      | OPERATING<br>TAPPET<br>CLEARANCE<br>(Hot unless noted) |           | Spark Plug Gap | Breaker Point Gap | Spark Occurs TC<br>B-Before<br>A-After | Comp. Pressure at<br>Cranking Speed |      |
|--------------------|---|----------------------|--|-----------|----------------|-------------------|--|-------------------------------------|------|
|                    | TC  | Flywheel<br>Teeth TC | Intake   | Exhaust   |                |                   |  |                                     |      |
| BUDA               |   |                      |  |           |                |                   |  |                                     |      |
| HP205              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 29°B                                | 87   |
| HP217              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 29°B                                | 93   |
| HP260              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 32°B                                | 87   |
| HP298              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 32°B                                | 87   |
| HP326              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 20°B                                | 103  |
| K369               | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   |                                     | 87   |
| K393               | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 30°B                                | 89   |
| K428               | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 30°B                                | 102  |
| L525               | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 27°B                                | 87   |
| LO525              | 10°B  |                      | .009   | .009      | .018           | .025              | .018                                   | 32°B                                | 93   |
| GF638              | 5°B   |                      | .010   | .012C     | .016C          | .025              | .018                                   |                                     | 87   |
| M766               | 10°B  |                      | .015   | .010      | .016           | .025              | .018                                   |                                     | 93   |
| 4DT212             | (Diesel)  | 20°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DT278             | (Diesel)  | 20°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DT294             | (Diesel)  | 20°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DT317             | (Diesel)  | 20°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DT389             | (Diesel)  | 12°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DT468             | (Diesel)  | 12°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| 6DH691             | (Diesel)  | 15°B                 | .015   | .009      | .012           |                   |  |                                     | 390+ |
| 4DT226             | (Diesel)  | 20°B                 | .009   | .009      | .012           |                   |  |                                     | 390+ |
| BTU                | 4°B   |                      | .010   | .010C     | .016C          | .025              | .018                                   |                                     | 84   |
| FR                 | 4°B   |                      | .010   | .010C     | .016C          | .025              | .018                                   |                                     | 82   |
| JV4                | 2°B   |                      | .010   | .010C     | .016C          | .025              | .018                                   |                                     | 80   |
| JK4                | 2°B   |                      | .010   | .010C     | .016C          | .025              | .018                                   |                                     | 85   |
| JK77               | 2°B   |                      | .010   | .010C     | .016C          | .025              | .018                                   | 17°B                                | 82   |
| HP351              | TC  | TC                   | .006   | .006      | .009           | .025              | .018                                   | 22°B                                | 103  |
| CONTINENTAL        |   |                      |  |           |                |                   |  |                                     |      |
| C400               |   |                      | .012   | .010C     | .010C          |                   |  |                                     | 100  |
| F6170              |   |                      | .014   | .014C     | .014C          |                   |  |                                     |      |
| F6199              |   |                      | .014   | .014C     | .014C          |                   |  |                                     |      |
| F6209              |   |                      | .014   | .014C     | .014C          |                   |  |                                     | 115  |
| F6218              |   |                      | .014   | .014C     | .014C          |                   |  |                                     | 118  |
| A6244              |   |                      | .014   | .017C     | .022C          |                   |  |                                     | 114  |
| 20C                |   |                      | .012   | .008H     | .010H          |                   |  |                                     | 83   |
| E600               |   |                      | .018   | .018C     | .022C          |                   |  |                                     | 102  |
| E601               |   |                      | .018   | .018C     | .022C          |                   |  |                                     | 97   |
| E602               |   |                      | .018   | .018C     | .022C          |                   |  |                                     | 102  |
| E603               |   |                      | .018   | .018C     | .022C          |                   |  |                                     | 99   |
| 20R                |   |                      | .014   | .013C     | .018C          |                   |  |                                     | 80   |
| 21R                |   |                      | .014   | .013C     | .018C          |                   |  |                                     | 78   |
| 22R                |   |                      | .014   | .013C     | .018C          |                   |  |                                     | 78   |
| Y4089              |   |                      | .012   | .012C     | .012C          |                   |  |                                     | 110  |
| Y4091              |   |                      | .012   | .012C     | .012C          |                   |  |                                     | 116  |
| F4124              |   |                      | .014   | .014C     | .014C          |                   |  |                                     | 108  |
| F4140              |   |                      | .014   | .014C     | .014C          |                   |  |                                     | 108  |
| F4162              |   |                      | .014   | .014C     | .014C          |                   |  |                                     | 109  |
| M6271              |   |                      | .0175  | .017C     | .022C          |                   |  |                                     | 114  |
| M6290              |   |                      | .0175  | .017C     | .022C          |                   |  |                                     | 120  |
| M6330              |   |                      | .0175  | .017C     | .022C          |                   |  |                                     | 116  |
| B6371              |   |                      | .022   | .017C     | .025C          |                   |  |                                     | 123  |
| B6405              |   |                      | .022   | .017C     | .025C          |                   |  |                                     | 124  |
| M6253              |   |                      | .0175  | .017C     | .022C          |                   |  |                                     | 110  |
| Y4112              |   |                      | .0125  | .012C     | .012C          |                   |  |                                     | 123  |
| HERCULES           |   |                      |  |           |                |                   |  |                                     |      |
| ZXA                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| ZXB                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| IX                 | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| IXF                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| IXA                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| IXK                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| IXB                | 5°A   | Var                  | .006   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| OOA                | 5°A   | Var                  | .010   | .008      | .012           | .025              | .020                                   | TC                                  | Opt  |
| OOB                | 5°A   | Var                  | .010   | .008      | .012           | .025              | .020                                   | TC                                  | Opt  |
| OOC                | 5°A   | Var                  | .010   | .008      | .012           | .025              | .020                                   | TC                                  | Opt  |
| OXA                | 5°B   | Var                  | .010   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| QXB                | 5°B   | Var                  | .010   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| QXC                | 5°B   | Var                  | .010   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| QXD                | 5°B   | Var                  | .010   | .006      | .008           | .025              | .020                                   | TC                                  | Opt  |
| JXA                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXF                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXG                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXE-3              | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXB                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXC                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| JXD                | 5°A   | Var                  | .010   | .008      | .010           | .025              | .020                                   | TC                                  | Opt  |
| HERCULES—Continued |   |                      |  |           |                |                   |  |                                     |      |
| WAC                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| WXC2               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| WXC3               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| WXL                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| WXL3               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| YXC                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| YXC2               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| YXC3               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| YXB                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| RXC                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| RXL                | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| RXL3               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| RXL4               | 2°A   | Var                  | .010   | .006      | .010           | .025              | .020                                   | TC                                  | Opt  |
| HXB                | 5°B   | Var                  | .015   | .010      | .016           | .025              | .020                                   | TC                                  | Opt  |
| HXC                | 5°B   | Var                  | .015   | .010      | .016           | .025              | .020                                   | TC                                  | Opt  |
| HXD                | 5°B   | Var                  | .015   | .010      | .016           | .025              | .020                                   | TC                                  | Opt  |
| HXE                | 5°B   | Var                  | .015   | .010      | .016           | .025              | .020                                   | TC                                  | Opt  |
| DOOB               | (Diesel)  | 12°B                 | Var  | .010      | .010           |                   |  |                                     | 500  |
| DOOC               | (Diesel)  | 12°B                 | Var  | .010      | .010           |                   |  |                                     | 500  |
| DOOD               | (Diesel)  | 12°B                 | Var  | .010      | .010           |                   |  |                                     | 500  |
| DJXB               | (Diesel)  | 12°B                 | Var  | .010      | .010           |                   |  |                                     | 475  |
| DJXC               | (Diesel)  | 12°B                 | Var  | .010      | .010           |                   |  |                                     | 475  |
| DRXB               | (Diesel)  | 12°B                 | Var  | .016      | .010           |                   |  |                                     | 475  |
| DRXC               | (Diesel)  | 12°B                 | Var  | .016      | .010           |                   |  |                                     | 475  |
| DHXB               | (Diesel)  | 5°B                  | Var  | .015      | .010           |                   |  |                                     | 475  |
| DFXB               | (Diesel)  | 5°B                  | Var  | .015      | .010           |                   |  |                                     | 475  |
| DHXC               | (Diesel)  | 5°B                  | Var  | .015      | .010           |                   |  |                                     | 475  |
| DFXC               | (Diesel)  | 5°B                  | Var  | .015      | .010           |                   |  |                                     | 475  |
| DFXD               | (Diesel)  | 5°B                  | Var  | .015      | .010           |                   |  |                                     | 475  |
| LYCOMING           |   |                      |  |           |                |                   |  |                                     |      |
| TS (1929-34)       | 5°A   | 1 1/2 A              | .010   | .006-.008 | .010-.012      | .025              | .018                                   |                                     |      |
| AEF (1933) on      | 5°B   | 1 1/2 B              | .012   | .008-.010 | .010-.012      | .025              | .018                                   |                                     |      |
| ASB (1930-33)      | 5°A   | 1 1/2 A              | .012   | .008-.010 | .010-.012      | .025              | .018                                   |                                     |      |
| ASD (1930-33)      | 5°A   | 1 1/2 A              | .012   | .008-.010 | .010-.012      | .025              | .018                                   |                                     |      |
| ASE (1934) on      | 5°A   | 1 1/2 A              | .012   | .008-.010 | .010-.012      | .025              | .018                                   |                                     |      |
| AFE (1930) on      | TC  | TC                   | .008   | .006-.008 | .006-.008      | .025              | .018                                   |                                     |      |
| GF (1934) on       | 7 1/2 B   | 2 1/2 B              | .012   | .008-.010 | .008-.010      | .025              | .018                                   |                                     |      |
| WFC (1934) on      | 7 1/2 B   | 2 1/2 B              | .012   | .008-.010 | .008-.010      | .025              | .018                                   |                                     |      |
| DC (1938) on       | 7°B   |                      | .012   | .010-.012 | .010-.012      | .025              | .018                                   |                                     |      |
| WAUKESHA           |   |                      |  |           |                |                   |  |                                     |      |
| 6BK                | 5°A   | 1 1/2 A              | .010   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 112  |
| 6MS                | 8°A   | 3A                   | .004   | .008-10C  | .012-14C       | .025              | .018                                   | Var                                 | 88   |
| 6ML                | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 89   |
| 6MK                | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 80   |
| 6MZ                | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 90   |
| 6SRL               | 10°A  | 3A                   | .004   | .008-10C  | .016-18C       | .025              | .018                                   | Var                                 | 90   |
| 6SRK               | 10°A  | 3A                   | .004   | .008-10C  | .016-18C       | .025              | .018                                   | Var                                 | 90   |
| 6AB                | 10°A  | 4A                   | .008   | .004-06C  | .008-10C       | .025              | .018                                   | Var                                 | 76   |
| 6RB                | 10°A  | 4A                   | .008   | .006-08C  | .010-12C       | .025              | .018                                   | Var                                 | 90   |
| 6BL                | 5°A   |                      | .010   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 112  |
| 6-90               | 5°B   |                      | .010   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 98   |
| 6-110              | 15°B  | 5B                   | .009   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 97   |
| 6-125              | 42°B  | 15B                  | .008   | .010-12C  | .018-20C       | .025              | .018                                   | Var                                 | 96   |
| 6SRS               | 10°A  |                      | .004   | .008-10C  | .016-18C       | .025              | .018                                   | Var                                 | 80   |
| 6BA                | TC  | TC                   | .010   | .010-12C  | .012-14C       | .025              | .018                                   | Var                                 | 112  |
| 6BM                | 5°A   | 1 1/2 A              | .010   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 112  |
| 6ZKA               | 8°A   | 2A                   | .004   | .008-10C  | .012-14C       | .025              | .018                                   | Var                                 | 111  |
| 6GAL               | TC  | TC                   | .008   | .015-17C  | .024-26C       | .025              | .018                                   | Var                                 | 112  |
| 6GAK               | TC  | TC                   | .008   | .015-17C  | .024-26C       | .025              | .018                                   | Var                                 | 112  |
| 6BKH               | 5°A   | 2A                   | .006   | .010-12C  | .018-20C       | .025              | .018                                   | 12°B                                | 135  |
| 6BZ                | 5°A   | 1 1/2 A              | .010   | .010-12C  | .014-16C       | .025              | .018                                   | Var                                 | 112  |
| 6WAL               | TC  | TC                   | .012   | .018-20C  | .026-27C       | .025              | .018                                   | Var                                 | 85   |
| 6WAK               | TC  | TC                   | .012   | .018-20C  | .026-27C       | .025              | .018                                   | Var                                 | 85   |
| 6WALH              | TC  | TC                   | .012   | .018-20C  | .025-27C       | .025              | .018                                   | 17°B                                | 125  |
| 6WAKH              | TC  | TC                   | .012   | .018-20C  | .025-27C       | .025              | .018                                   | 17°B                                | 125  |
| 6MKR               | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 80   |
| 6MZR               | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 90   |
| 6SRLR              | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 90   |
| 6SRKR              | 8°A   | 3A                   | .004   | .008-10C  | .014-16C       | .025              | .018                                   | Var                                 | 90   |
| 6BRB               | 10°A  | 4A                   | .008   | .006-08C  | .010-12C       | .025              | .018                                   | Var                                 | 90   |
| 130HS, 130GS       | 5°A   | 1 1/2 A              | .012   | .009-11C  | .014-16C       | .025              | .018                                   | 16°B                                | 130  |
| 130HL, 130GL       | 5°A   | 1 1/2 A              | .012   | .009-11C  | .014-16C       | .025              | .018                                   | 16°B                                | 130  |
| 140HS, 140GS       | 5°A   | 1 1/2 A              | .010   |           |                | .025              | .018                                   | 16°B                                | 130  |
| 140HK, 140GK       | 5°A   | 1 1/2 A              | .010   |           |                | .025              | .018                                   | 16°B                                | 130  |
| 145HS, 145GS       | 5°A   | 4A                   | .006   | .009-11C  | .02            |                   |  |                                     |      |

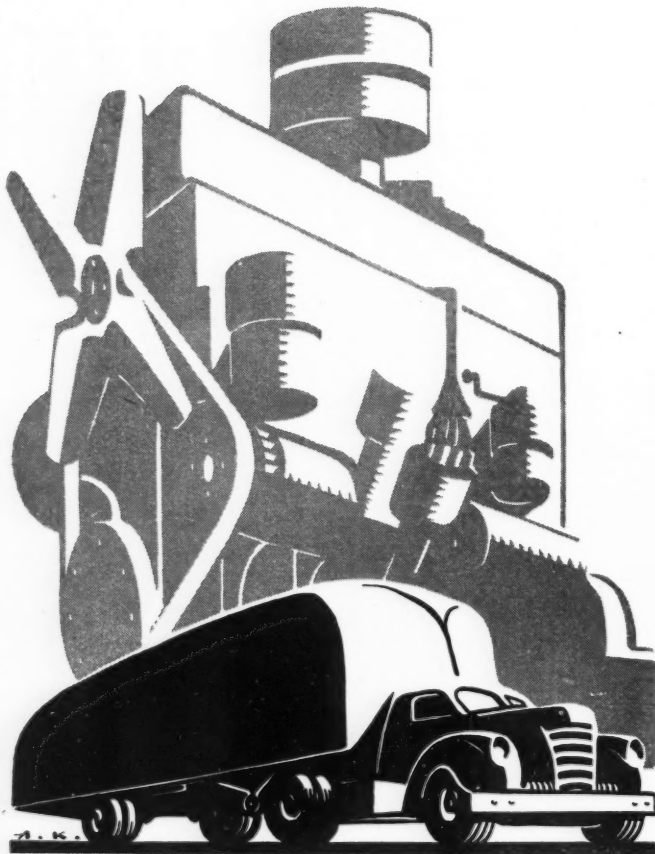
## KEY TO SYMBOLS AND ABBREVIATIONS

C—Cold  
Opt—Optional  
TC—Top Center

■—2400 RPM  
†—600 RPM  
‡—2800 RPM

\*—1000 RPM  
▲—2600 RPM  
▼—2200 RPM

# TRUCK TUNE-UP



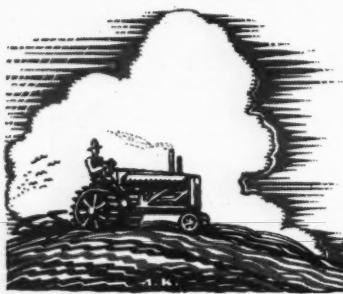
## and REPAIR DATA

| TRUCK MAKE AND MODEL  | Intake Valve Opens B-Before A-After | Flywheel Teeth TC | OPERATING TAPPET CLEARANCE (Hot unless noted) |         | Spark Plug Gap | Breaker Point Gap | Spark Occurs TC B-Before A-After | Spark Occurs Flywheel Teeth TC | Comp. Pressure at Cranking Speed |
|---|-------------------------------------|-------------------|---|---------|----------------|-------------------|----------------------------------|--------------------------------|----------------------------------|
|   |                                     |                   | Intake  | Exhaust |                |                   |                                  |                                |                                  |
| AUTOCAR<br>TF, TFF, 6TF<br>RM, RL, RMT (1937)<br>D, ITR, 6X2RL, RLD, IUTR, 6X2UD<br>DF, 2TR, 6X2DF, DH, UDF, 2UTR, 6X4DF<br>4X4N, 6X4DF (1937)<br>6X2UNF, 3UTR, 4UTR, 3TR, 4TR, 6X2NF, C, 4X4NF (1937)<br>6T, UT, UTT, 6UT, N75C, 4X4S (1936-37), C, T, TT, 6X3T, 6X4UT, 5TR, 5UTR, 6X4TO, 6X4UTO, 6X4UTD, 6X4TC, 6X4TD<br>A, UA, C10, C10T, U10, U10T<br>B, UB, C20, C20T, U20, U20T<br>RB, URB<br>RL, RLS, ITR, RLD, DP, 6X2RL, URL, URLS, UD, IUTR, UDP, 6X2UD<br>DF, N, 2TR, DH, 6X2DF, 6X4DF, UDF, UN, 2UTR<br>6X2UN, 4X4DF<br>NF, 3TR, 4TR, S, 6X2NF, UNF, 3UTR, 4UTR, US, 6X2UNF, 4X4N<br>C30, C30T, U30, U30T (1940-41) | 10"A                                | 33/A              | .006  | .010    | P              | Z                 | 9"B                              | 31/B                           | 80                               |
|   | TC                                  | TC                | .015  | .018    | P              | D                 | 8 1/2"B                          | 1 1/2"B                        | 98                               |
|   | TC                                  | TC                | .015  | .018    | P              | D                 | 8 1/2"B                          | 1 1/2"B                        | 98                               |
|   | TC                                  | TC                | .020  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .020  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
| DIAMOND T—Continued<br>803C, 804C, 805, 806 (1940-41)<br>900 (1940-41)<br>201, 306, 306SC (1941-42)   | 5"A                                 | 11/A              | .006  | .010    | P              | Z                 | 5"A                              | 11/A                           | 80                               |
|   | TC                                  | TC                | .015  | .018    | P              | D                 | 2"A                              | TC                             | 98                               |
|   | TC                                  | TC                | .015  | .018    | P              | D                 | 2"A                              | TC                             | 98                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
|   | TC                                  | TC                | .015  | .018    | P              | Z                 | 2"B                              | 1/4 B                          | 95                               |
| DODGE<br>LC, LE Series<br>LG, LH Series<br>MC, RC (1937-38)<br>RD, MD Series (1937-38)<br>RE, ME Series (1937-38)<br>RG, RH, MG, MH Series (1937-38)<br>RL, RK, RO, RP, ML, MK Series (1937-38)<br>TD (1939)<br>TE (1939)<br>TF (1939)<br>TG, TH (1939)<br>TL, TK (1939)  | 6"A                                 | 21/A              | .006  | .008    | P              | Z                 | 6"A                              | 21/A                           | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |
|   | TC                                  | TC                | .015  | .012    | P              | Z                 | 2"A                              | TC                             | 95                               |

| Model  | Year | Displacement | Power | Speed | Weight | Price | Notes |
|--|------|--------------|-------|-------|--------|-------|-------|
| C40, C40T, C40D, C40E2, C40E4, U40, U40T, U40D, U40E2, C50, C50D, U50, C60, U60, U60D, U60E2, C60E4, C60E6, C70, C70D, C70E2, C70E4, U70, U70D, U70E2, C80, C80T, C80D, C80E2, C80E4, U80, U80D, U80E2, C90, C90T, C90D, C90E2, C90E4, U90, U90D, U90E2, C100, C100T, C100D, C100E2, C100E4, U100, U100D, U100E2, C110, C110T, C110D, C110E2, C110E4, U110, U110D, U110E2, C120, C120T, C120D, C120E2, C120E4, U120, U120D, U120E2, C130, C130T, C130D, C130E2, C130E4, U130, U130D, U130E2, C140, C140T, C140D, C140E2, C140E4, U140, U140D, U140E2, C150, C150T, C150D, C150E2, C150E4, U150, U150D, U150E2, C160, C160T, C160D, C160E2, C160E4, U160, U160D, U160E2, C170, C170T, C170D, C170E2, C170E4, U170, U170D, U170E2, C180, C180T, C180D, C180E2, C180E4, U180, U180D, U180E2, C190, C190T, C190D, C190E2, C190E4, U190, U190D, U190E2, C200, C200T, C200D, C200E2, C200E4, U200, U200D, U200E2, C210, C210T, C210D, C210E2, C210E4, U210, U210D, U210E2, C220, C220T, C220D, C220E2, C220E4, U220, U220D, U220E2, C230, 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AC700, AF700 (1939-41); AC620, AC700, AC770, AF620.



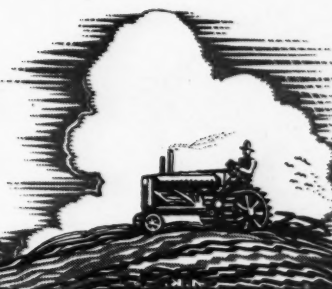


# TRACTOR TUNE-UP

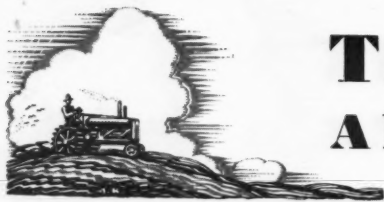


| MAKE<br>AND<br>MODEL |         | No. of<br>Cylinders<br>Bore and<br>Stroke | Operating<br>Tappet<br>Clearance       |  | VALVE TIMING                               |         |  |   | Piston and Rod Assembly<br>Removed from | IGNITION TIMING |                   |                                       |   | Crankcase Capacity<br>(Quarts) | Cooling System Capacity<br>(Quarts) | Transmission Oil<br>Capacity (Quarts) | Compression Pressure at<br>Cranking Speed | FUEL |
|----------------------|---------|---|--|--|--|---------|--|---|---|-----------------|-------------------|---------------------------------------|---|--------------------------------|-------------------------------------|---------------------------------------|---|------|
|                      |         |   | Inlet (Hot unless<br>specified by "C") | Exhaust (Hot unless<br>specified by "C") | Tappet<br>Clearance<br>for Valve<br>Timing |         | Inlet Valve Opens<br>(Degrees B or A T.C.) | Exhaust Valve Closes<br>(Degrees B or A T.C.) |   | Spark Plug Gap  | Breaker Point Gap | Spark Occurs<br>(Degrees B or A T.C.) | Breaker Housing<br>Advanced or Retarded |                                |                                     |                                       |   |      |
|                      |         |   |  |  | Inlet                                      | Exhaust |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| ALLIS-CHALMERS       |         |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| WC                   | 1934-38 | 4-4x4                                     | .010                                   | .010                                     | .010                                       | .010    | TC   | 10A   | B                                       | .030            | *                 | 30B                                   | Adv                                     | 6                              | 16                                  | 10                                    | 82  | GD   |
| WF                   | 1934-38 | 4-4x4                                     | .010                                   | .010                                     | .010                                       | .010    | TC   | 10A   | B                                       | .030            |                   | 30B                                   | Adv                                     | 6                              | 16                                  | 10                                    | 82  | GD   |
| U                    | 1934-38 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 10A  | 10A   | B                                       | .030            | .015              | 30B                                   | Adv                                     | 9 1/2                          | 24                                  | 14                                    | 95  | GKD  |
| UC                   | 1934-38 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 10A  | 10A   | B                                       | .030            | .015              | 30B                                   | Adv                                     | 9 1/2                          | 24                                  | 14                                    | 95  | GKD  |
| U                    | 1929-33 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 5A   | 5A  | B                                       | .030            | .013              | 18B                                   | Adv                                     | 14                             | 24                                  | 14                                    | 80  | G    |
| UC                   | 1929-33 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 5A   | 5A  | B                                       | .030            | .013              | 18B                                   | Adv                                     | 14                             | 24                                  | 14                                    | 80  | G    |
| A                    | 1937-38 | 4-4 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | B                                       | .030            | .015              | 26B                                   | Adv                                     | 9 1/2                          | 46                                  | 18                                    | 86  | G    |
| M                    | 1936-38 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 10A  | 10A   | B                                       | .030            | .015              | 32B                                   | Adv                                     | 9 1/2                          | 24                                  | 14                                    | 80  | G    |
| WM                   | 1936-38 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 10A  | 10A   | B                                       | .030            | .015              | 32B                                   | Adv                                     | 9 1/2                          | 24                                  | 14                                    | 80  | G    |
| M                    | 1934-35 | 4-4 1/2 x 5                               | .010                                   | .012                                     | .010                                       | .012    | 10A  | 10A   | B                                       | .030            | .015              | 32B                                   | Adv                                     | 9 1/2                          | 24                                  | 14                                    | 80  | G    |
| K, WK                | 1934-37 | 4-5x6 1/2                                 | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | A                                       | .025            | .015              | 26B                                   | Adv                                     | 14                             | 46                                  | 20                                    | 86  | G    |
| L                    | 1934-37 | 6-5 1/2 x 8 1/2                           | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | A                                       | .025            | .015              | 26B                                   | Adv                                     | 24                             | 76                                  | 32                                    | 86  | G    |
| LO, LLO              | 1937    | 6-5 1/2 x 8 1/2                           | .016                                   | .016                                     | .016                                       | .016    | 5A   | 9A  | A                                       | .025            | .020              | 12B                                   | Adv                                     | 26                             | 76                                  | 32                                    | 125                                       | O    |
| SO                   | 1937    | 4-5 1/2 x 8 1/2                           | .016                                   | .016                                     | .016                                       | .016    | TC   | 19A   | A                                       | .025            | .015              | 10B                                   | Adv                                     | 20                             | 50                                  | 23                                    | 125                                       | O    |
| KO, WKO              | 1937    | 4-5 1/2 x 8 1/2                           | .016                                   | .016                                     | .016                                       | .016    | 5A   | 9A  | A                                       | .025            | .020              | 12B                                   | Adv                                     | 16                             | 46                                  | 14                                    | 125                                       | O    |
| WSO                  | 1937    | 4-5 1/2 x 8 1/2                           | .016                                   | .016                                     | .016                                       | .016    | TC   | 19A   | A                                       | .025            | .015              | 10B                                   | Adv                                     | 20                             | 50                                  | 23                                    | 125                                       | O    |
| 25-40                | 1930-36 | 4-5x6 1/2                                 | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | B or T                                  | .030            | .015              | 26B                                   | Adv                                     | 14                             | 46                                  | 20                                    | 86  | GKD  |
| E                    | 1930-36 | 4-5 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | B or T                                  | .030            | .015              | 26B                                   | Adv                                     | 14                             | 46                                  | 20                                    | 86  | GKD  |
| 20-35                | 1925-30 | 4-4 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    | 5A   | 9A  | B                                       | .030            | .015              | 26B                                   | Adv                                     | 14                             | 46                                  | 16                                    | 86  | G    |
| HD-7                 |         | 3-4 1/2 x 5                               | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 11                             | 26                                  |                                       |   | O    |
| HD-10                |         | 4-4 1/2 x 5                               | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 13                             | 24                                  |                                       |   | O    |
| HD-14                |         | 6-4 1/2 x 5                               | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 14                             | 40                                  |                                       |   | O    |
| S                    |         | 4-5 1/2 x 8 1/2                           | .015                                   | .015                                     | .015                                       | .015    |  |   |   |                 |                   |                                       |   | 20                             | 23                                  |                                       |   | G    |
| C                    |         | 4-3 1/2 x 3 1/2                           |  |  |  |         |  |   |   |                 |                   |                                       |   | 4                              | 6                                   |                                       |   | GD   |
| B                    |         | 4-3 1/2 x 3 1/2                           | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 4                              | 6                                   |                                       |   | GD   |
| IB                   |         | 4-3 1/2 x 3 1/2                           | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 4                              | 6                                   |                                       |   | GD   |
| RC                   |         | 4-3 1/2 x 3 1/2                           | .010                                   | .010                                     | .010                                       | .010    |  |   |   |                 |                   |                                       |   | 4                              | 4                                   |                                       |   | GD   |
| A                    |         | 4-5x6 1/2                                 | .010                                   | .012                                     | .010                                       | .012    |  |   |   |                 |                   |                                       |   | 14                             | 48                                  |                                       |   | D    |
| BEEMAN               |         |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| M                    | 1932-33 | 1-3 1/2 x 4 1/2                           | .006                                   | .006                                     | .006                                       | .006    | 24A  | TC  | B                                       | .025            | .015              | 32B                                   | Adv                                     | 1 1/4                          |                                     |                                       |   | G    |
| Hy-wheel             | 1932-38 | 1-3 1/2 x 4 1/2                           | .006                                   | .006                                     | .006                                       | .006    | 24A  | TC  | B                                       | .025            | .015              | 32B                                   | Adv                                     | 1 1/4                          |                                     |                                       |   | G    |
| MS                   | 1934-36 | 1-3 1/2 x 4 1/2                           | .006                                   | .006                                     | .006                                       | .006    | 24A  | TC  | B                                       | .025            | .015              | 32B                                   | Adv                                     | 1 1/4                          |                                     |                                       |   | G    |
| CASE                 |         |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| CO                   | 1932-33 | 4-3 1/2 x 5 1/2                           | .020                                   | .020                                     | .020                                       | .020    | 5 1/2 A                                    | 5 1/2 A                                       | B or T                                  | .020            | .014              | TC                                    | Ret                                     | 8                              | 20                                  |                                       | 73  | G    |
| CC                   | 1932-39 | 4-3 1/2 x 5 1/2                           | .018                                   | .018                                     | .018                                       | .018    | 5 1/2 A                                    | 5 1/2 A                                       | B or T                                  | .020            | .014              | TC                                    | Ret                                     | 7-8                            | 20                                  |                                       | 73  | GKD  |
| C                    | 1932-39 | 4-3 1/2 x 5 1/2                           | .018                                   | .018                                     | .018                                       | .018    | 5 1/2 A                                    | 5 1/2 A                                       | B or T                                  | .020            | .014              | TC                                    | Ret                                     | 7-8                            | 20                                  |                                       | 73  | GKD  |
| L                    | 1932-36 | 4-4 1/2 x 6                               | .020                                   | .020                                     | .020                                       | .020    | 7A   | 12A   | B or T                                  | .020            | .014              | TC                                    | Ret                                     | 14                             | 50                                  |                                       | 66  | GKD  |
| RC, R                | 1939    | 4-4 1/2 x 6                               | .010                                   | .012                                     | .010                                       | .012    |  |   |   | .030            |                   | TC                                    | Ret                                     | 7                              | 17                                  |                                       |   | G    |
| L                    | 1940    | 4-3 1/2 x 4                               | .018                                   | .018                                     | .018                                       | .018    | TC   |   | T                                       | .020            |                   | TC                                    | Ret                                     | 12                             | 50                                  |                                       |   | GKD  |
| V                    | 1940    | 4-4 1/2 x 6                               | .014                                   | .014                                     | .014                                       | .014    |  |   |   | .025            |                   | TC                                    | Ret                                     | 4                              | 12                                  |                                       |   | G    |
| S                    | 1941    | 4-  | .010                                   | .010                                     | .010                                       | .010    | TC   | 10A   |   | .025            |                   | FWM                                   | Ret                                     | 5                              | 16                                  | 36                                    |   | G    |
| LA                   | 1941    | 4-  | .018                                   | .018                                     | .018                                       | .018    | TC   | 10A   | T                                       | .030            |                   | FWM                                   | Ret                                     | 12                             | 61                                  | 68                                    |   | GKD  |
| D                    | 1941    | 4-  | .018                                   | .018                                     | .018                                       | .018    | TC   | 5 1/2 A                                       |   | .030            |                   | FWM                                   | Ret                                     | 7                              | 29                                  | 40                                    |   | G    |
| CATERPILLAR          |         |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| Diesel 75            | 1934    | 6-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 28                             | 112                                 | 40                                    | 575                                       | O    |
| Diesel 50            | 1934    | 4-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 14                             | 74                                  | 32                                    | 575                                       | O    |
| Diesel 35            | 1934    | 3-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 14                             | 64                                  | 20                                    | 575                                       | O    |
| Diesel 40            | 1935    | 3-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 14                             | 64                                  | 20                                    | 575                                       | O    |
| Diesel 50            | 1935    | 4-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 14                             | 74                                  | 32                                    | 575                                       | O    |
| 70                   | 1935    | 4-7x8 1/2                                 | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       |   | 24                             | 120                                 | 40                                    |   | G    |
| Diesel 75            | 1935    | 6-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       |                 |                   | 16B                                   |   | 28                             | 112                                 | 40                                    | 575                                       | O    |
| 22                   | 1936    | 4-4x5                                     | .010                                   | .012                                     | .010                                       | .012    |  |   | B                                       | .025            | .015              |                                       |   | 10                             | 20                                  | 8                                     |   | GD   |
| 30                   | 1936    | 4-4 1/2 x 5 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       |   | 14                             | 44                                  | 20                                    |   | GD   |
| Diesel RD4           | 1936    | 4-4 1/2 x 5 1/2                           | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 16                             | 44                                  | 20                                    | 575                                       | O    |
| 40                   | 1936    | 4-5 1/2 x 6 1/2                           | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 37                                  | 20                                    |   | G    |
| Diesel RD6           | 1936    | 3-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 64                                  | 20                                    | 575                                       | O    |
| 50                   | 1936    | 4-5 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 46                                  | 32                                    |   | G    |
| Diesel RD7           | 1936    | 4-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 74                                  | 32                                    | 575                                       | O    |
| 70                   | 1936    | 4-7x8 1/2                                 | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       | Set                                     | 24                             | 120                                 | 40                                    |   | G    |
| Diesel RD8           | 1936    | 6-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 28                             | 112                                 | 40                                    | 575                                       | O    |
| 22                   | 1937-38 | 4-4x5                                     | .010                                   | .012                                     | .010                                       | .012    |  |   | B                                       | .025            | .015              |                                       | Set                                     | 10                             | 20                                  | 8                                     |   | GD   |
| 30                   | 1937    | 4-4 1/2 x 5 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       | Set                                     | 14                             | 44                                  | 20                                    |   | GD   |
| Diesel RD4           | 1937    | 4-4 1/2 x 5 1/2                           | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 16                             | 44                                  | 20                                    | 575                                       | O    |
| Diesel RD6           | 1937    | 3-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 64                                  | 20                                    | 575                                       | O    |
| R5                   | 1937    | 4-5 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       | Set                                     | 14                             | 46                                  | 32                                    |   | G    |
| 50                   | 1937    | 4-5 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       | Set                                     | 14                             | 46                                  | 32                                    |   | G    |
| Diesel RD7           | 1937    | 4-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 74                                  | 32                                    | 575                                       | O    |
| 70                   | 1937    | 4-7x8 1/2                                 | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              |                                       | Set                                     | 24                             | 120                                 | 40                                    |   | G    |
| Diesel RD8           | 1937    | 6-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 28                             | 112                                 | 40                                    | 575                                       | O    |
| Diesel D2            | 1938    | 4-3 1/2 x 5                               | .013                                   | .013                                     | .013                                       | .013    |  |   | PTRB                                    | .025            | .015              | 22B                                   |   | 12                             | 31                                  | 8                                     |   | O    |
| Diesel D4            | 1938    | 4-4 1/2 x 5 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   | Set                                     | 16                             | 44                                  | 20                                    | 575                                       | C    |
| R5                   | 1938    | 4-4 1/2 x 5 1/2                           | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 46                                  | 32                                    |   | G    |
| Diesel D6            | 1938    | 4-5 1/2 x 6 1/2                           | .010                                   | .012                                     | .010                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   | Set                                     | 14                             | 64                                  | 20                                    | 575                                       | O    |
| Diesel D7            | 1938    | 3-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 14                             | 74                                  | 32                                    | 575                                       | O    |
| Diesel D8            | 1938    | 4-5 1/2 x 8                               | .012                                   | .012                                     | .012                                       | .012    |  |   | A                                       | .025            | .015              | 18B                                   |   | 28                             | 112                                 | 40                                    | 575                                       | O    |
| CLETRAC              |         |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| K20                  | 1932    | 4-4x5 1/2                                 | .015C                                  | .015C                                    | .015C                                      | .015C   | 7 1/2 A                                    | 5A  | A                                       | .025            | .015              | 4B                                    | Ret                                     | 5                              | 16                                  |                                       | 76  | GKD  |
| 15                   | 1932-33 | 4-4x4 1/2                                 | .010                                   | .016                                     | .010                                       | .016    | 5A   | 5A  | A                                       | .025            | .020              | 4B                                    | Ret                                     | 5                              | 16                                  |                                       | 76  | GKD  |
| 40-30                | 1932-33 | 6-4 1/2 x 4 1/2                           | .008                                   | .012                                     | .008                                       | .012    | 2A   | 2A  | A                                       | .025            | .020              | 4B                                    | Ret                                     | 7                              | 22                                  |                                       | 76  | GKD  |
| 40                   | 1932    | 6-4 1/2 x 5                               | .018                                   | .020                                     | .018                                       | .020    | TC   | TC  | A                                       | .025</          |                   |                                       |   |                                |                                     |                                       |   |      |

# AND REPAIR DATA

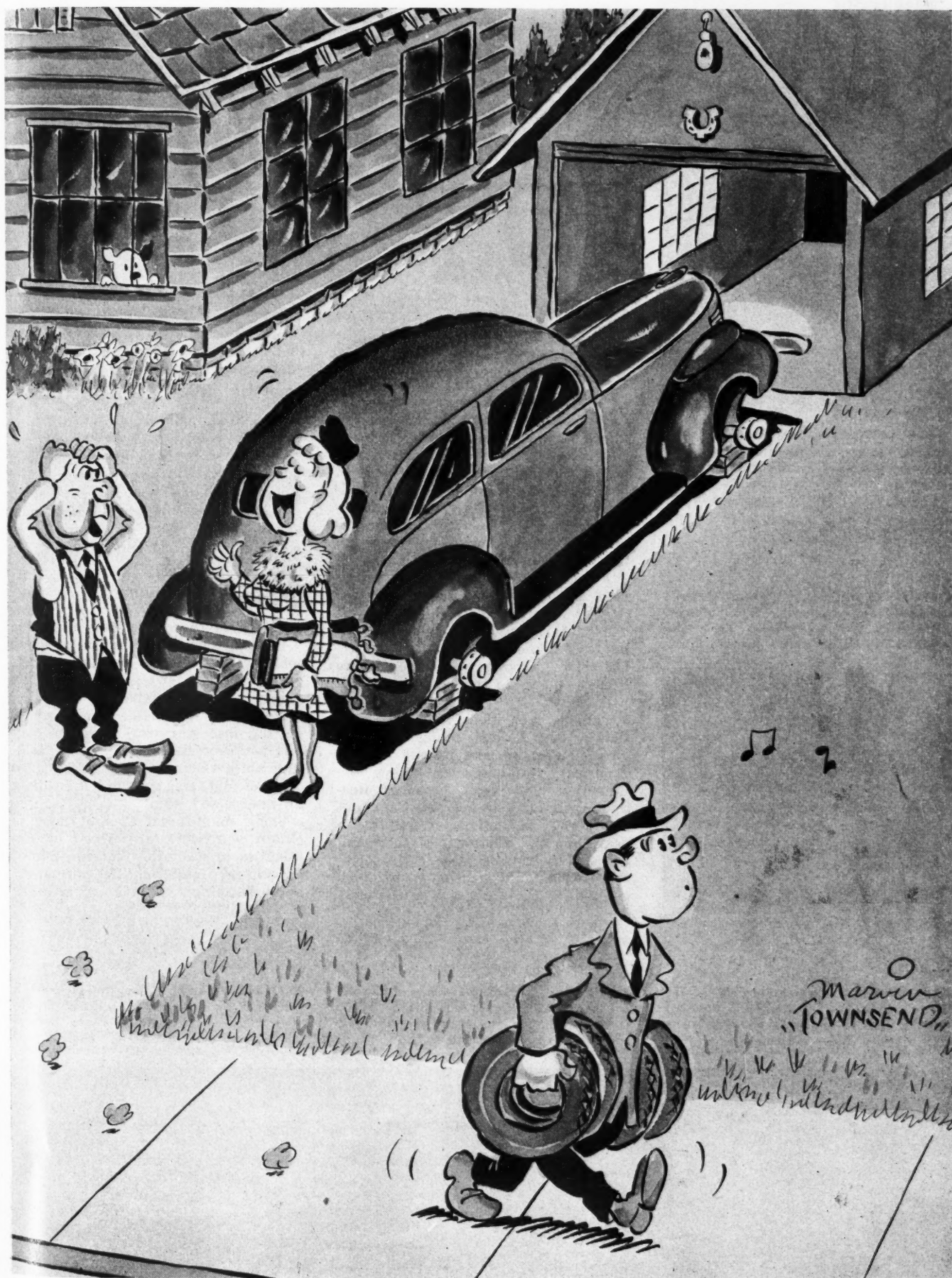


| MAKE<br>AND<br>MODEL            |         | No. of<br>Cylinders<br>Bore and<br>Stroke | Operating<br>Tappet<br>Clearance       |  | VALVE TIMING                            |         |  |   | Piston and Rod Assembly<br>Removed from | IGNITION TIMING |                   |                                       |   | Crankcase Capacity<br>(Quarts) | Cooling System Capacity<br>(Quarts) | Transmission Oil<br>Capacity (Quarts) | Compression Pressure at<br>Cranking Speed | FUEL |
|---------------------------------|---------|---|--|--|---|---------|--|---|---|-----------------|-------------------|---------------------------------------|---|--------------------------------|-------------------------------------|---------------------------------------|---|------|
|                                 |         |   | Inlet (Hot unless<br>specified by "C") | Exhaust (Hot unless<br>specified by "C") | Tappet<br>Clearance for Valve<br>Timing |         | Inlet Valve Opens<br>(Degrees B or A T.C.) | Exhaust Valve Closes<br>(Degrees B or A T.C.) |   | Spark Plug Gap  | Breaker Point Gap | Spark Occurs<br>(Degrees B or A T.C.) | Breaker Housing<br>Advanced or Retarded |                                |                                     |                                       |   |      |
|                                 |         |   |  |  | Inlet                                   | Exhaust |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| CLETRAC—Continued               |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| 25                              | 1933-35 | 6-3 1/2 x 4 1/2                           | .010                                   | .012                                     | .010                                    | .012    | 5A   | 5A  | A                                       | .025            | .020              | TC                                    | Ret                                     | 6                              | 16                                  |                                       | 76  | G    |
| 35                              | 1933-35 | 6-4 1/2 x 4 1/2                           | .008                                   | .012                                     | .008                                    | .012    | 2A   | 2A  | A                                       | .025            | .020              | TC                                    | Ret                                     | 7                              | 22                                  |                                       | 76  | GKD  |
| 55                              | 1933-35 | 6-4 1/2 x 5                               | .018                                   | .020                                     | .018                                    | .020    | TC   | 5A  | A                                       | .025            | .015              | TC                                    | Ret                                     | 9                              | 22                                  |                                       | 72  | G    |
| 80                              | 1933-35 | 6-5 1/2 x 6                               | .010                                   | .016                                     | .010                                    | .016    | 5B   |   | A                                       | .025            | .020              | TC                                    | Ret                                     | 20                             | 30                                  |                                       | 76  | G    |
| 20                              | 1934-35 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .020              | 4B                                    | Ret                                     | 5                              | 18                                  |                                       | 76  | GKD  |
| AG                              | 1936-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 80  | GK   |
| BG                              | 1936-37 | 6-3 1/2 x 4 1/2                           | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015*             | 18B*                                  | Adv                                     |                                | 20                                  |                                       | 80  | GK   |
| BG                              | 1938    | 6-3 1/2 x 4 1/2                           | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015*             | 18B*                                  | Adv                                     |                                | 20                                  |                                       | 80  | GK   |
| CG                              | 1936    | 6-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 2A   | 2A  | A                                       | .025            | .020              | 4 1/2 B                               | Ret                                     |                                | 22                                  |                                       | 80  | GK   |
| CG                              | 1937-38 | 6-4 1/2 x 4 1/2                           | .010                                   | .016                                     | .010                                    | .016    | 2A   | 2A  | A                                       | .025            | .015†             | 15 1/2 B†                             | Adv                                     |                                | 22                                  |                                       | 82  | GK   |
| FG                              | 1936-38 | 6-5 1/2 x 6                               | .010                                   |  | .010                                    | .016    | 5B   |   | A                                       | .025            | .020              | TC                                    | Ret                                     | 7                              | 22                                  |                                       | 82  | GK   |
| EN                              | 1936    | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E                               | 1936    | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E31                             | 1937-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E38                             | 1937-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E62                             | 1937-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E68                             | 1937-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| E76                             | 1937-38 | 4-4 x 4 1/2                               | .010                                   | .016                                     | .010                                    | .016    | 5A   | 5A  | A                                       | .025            | .015              | 24B                                   | Adv                                     |                                | 16                                  |                                       | 84  | GK   |
| Diesel BD                       | 1937-38 | 6-3 1/2 x 4 1/2                           | .030                                   | .030                                     | .030                                    | .030    | TC   | TC  | A                                       |                 |                   | 22B                                   |   | 10                             | 20                                  |                                       | 86  | O    |
| DG                              | 1937-38 | 4-3 3/4 x 4 3/4                           | .006                                   |  | .008                                    | .012    | 2A   |   | A                                       | .025            | .020              | TC                                    | Ret                                     | 11                             | 22                                  |                                       | 86  | O    |
| Diesel DD                       | 1937-38 | 6-4 3/4 x 5 1/4                           | .016                                   | .016                                     | .016                                    | .016    |  |   | A                                       |                 |                   | 30B                                   |   | 14                             | 26                                  |                                       | 86  | O    |
| Diesel FD                       | 1937-38 | 6-5 x 6                                   | .016                                   | .016                                     | .016                                    | .016    | 5B   | 10A   | A                                       |                 |                   | 39B                                   |   | 14                             | 26                                  |                                       | 86  | O    |
| GG (The General)                | 1937-38 | 4-3 1/2 x 4                               | .006                                   | .008                                     | .006                                    | .008    | 5A   | 5A  | A                                       | .025            | .015              | 14B                                   |   | 5                              | 11                                  | 10                                    | 8   | G    |
| HG                              |         | 4-3 x 4                                   | .006                                   | .008                                     | .006                                    | .008    | 5A   | 5A  | A                                       | .025            | .015              | 14B                                   |   | 5                              | 11                                  | 8                                     | 8   | G    |
| AD (Diesel)                     |         | 4-4 x 4 1/2                               | .030                                   | .030                                     | .030                                    | .030    | TC   | TC  | A                                       |                 |                   | 22B <sup>(3)</sup>                    |   |                                | 12                                  |                                       |   | KDO  |
| FORDSON                         |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
|                                 | 1930-38 | 4-4 1/2 x 5                               | .020                                   | .020                                     | .020                                    | .020    | 10A  | TC  | A                                       | .030            | .025              | TC                                    | Ret                                     | 11                             | 48                                  | 18                                    | 68  | GK   |
| GRAHAM-BRADLEY                  |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| Row Crop                        | 1938    | 6-3 1/2 x 4 3/8                           | .012                                   | .012                                     | .010                                    | .010    | TC   | TC  | A                                       | .025            | .018              | 2B                                    | Ret                                     | 5                              | 16                                  |                                       | 95  | G    |
| Standard                        | 1938    | 6-3 1/2 x 4 3/8                           | .012                                   | .012                                     | .010                                    | .010    | TC   | TC  | A                                       | .025            | .018              | 2B                                    | Ret                                     | 5                              | 16                                  |                                       | 95  | G    |
| HART-PARR                       |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| 12-24                           | 1925-32 | 2-5 1/2 x 6 1/2                           | .030                                   | .030                                     | .030                                    | .030    | 10A  | 10A   | Head                                    | .030            | .015              | 32B                                   | Adv                                     | 7 1/2                          | 32                                  |                                       | 56  | GKD  |
| 18-36                           | 1926-32 | 2-6 1/2 x 7                               | .030                                   | .030                                     | .030                                    | .030    | 10A  | 10A   | Head                                    | .030            | .015              | 32B                                   | Adv                                     | 7 1/2                          | 44                                  |                                       | 55  | GKD  |
| 28-50                           | 1927-32 | 4-5 1/2 x 6 1/2                           | .030                                   | .030                                     | .030                                    | .030    | 10A  | 10A   | B or T                                  | .030            | .015              | 32B                                   | Adv                                     | 13                             | 56                                  |                                       | 56  | GKD  |
| INTERNATIONAL HARVESTER COMPANY |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| Farmall F12                     | 1937-38 | 4-3 x 4                                   | .013                                   | .013                                     | .013                                    | .013    |  |   | B                                       | .025            | .013              | TC                                    | Ret                                     | 5 1/2                          | 14                                  | 16                                    |   | GKD  |
| Farmall F20                     | 1937-38 | 4-3 3/4 x 5                               | .009                                   | .009                                     | .009                                    | .009    |  |   | A                                       | .025            | .013              | TC                                    | Ret                                     | 7                              | 29                                  | 32                                    |   | GD   |
| Farmall F30                     | 1937-38 | 4-4 1/4 x 5                               | .017                                   | .017                                     | .017                                    | .017    |  |   | A                                       | .025            | .013              | TC                                    | Ret                                     | 7                              | 40                                  | 28                                    |   | GD   |
| International 1-12              | 1937-38 | 4-3 x 4                                   | .013                                   | .013                                     | .013                                    | .013    |  |   | B                                       | .025            | .013              | TC                                    | Ret                                     | 5                              | 14                                  | 16                                    |   | GKD  |
| International 20                | 1937    | 4-4 1/4 x 5                               | .011                                   | .011                                     | .011                                    | .011    |  |   | A                                       | .025            | .013              | TC                                    | Ret                                     | 7                              | 40                                  | 26                                    |   | GKD  |
| International ID40              | 1937-38 | 4-4 1/2 x 6 1/2                           | .018                                   | .018                                     | .018                                    | .018    | 10B  | 10A   | B                                       | .025            | .013              | TC                                    | Ret                                     | 12                             | 56                                  | 60                                    |   | GO   |
| International 130               | 1937-38 | 4-4 1/4 x 5                               | .017                                   | .017                                     | .017                                    | .017    |  |   | A                                       | .025            | .013              | TC                                    | Ret                                     | 7                              | 44                                  | 32                                    |   | GKD  |
| International 140               | 1937-38 | 6-3 3/4 x 4 1/2                           | .016                                   | .016                                     | .016                                    | .016    | 10A  | 15A   | A                                       | .020            | .020              | TC                                    | Ret                                     | 9                              | 48                                  | 60                                    |   | GKD  |
| International T20               | 1937-38 | 4-3 3/4 x 5                               | .016                                   | .016                                     | .016                                    | .016    |  |   | A                                       | .025            | .015              | TC                                    | Ret                                     | 6                              | 32                                  | 46                                    |   | GD   |
| International T40               | 1937-38 | 6-3 3/4 x 4 1/2                           | .016                                   | .016                                     | .016                                    | .016    | 10A  | 15A   | A                                       | .020            | .020              | TC                                    | Ret                                     | 9                              | 48                                  | 64                                    |   | GKD  |
| International TD40              | 1937-38 | 4-4 1/2 x 6 1/2                           | .018*                                  | .018*                                    | .018*                                   | .018*   | 10B  | 10A   | B                                       | .025            | .013              | TC                                    | Ret                                     | 12                             | 56                                  | 64                                    |   | GO   |
| International T35               | 1938    | 6-3 3/4 x 4 1/2                           | .016                                   | .016                                     | .016                                    | .016    | 10A  | 15A   | B                                       | .025            | .020              | TC                                    | Ret                                     | 9                              | 32                                  | 64                                    |   | GKD  |
| International TD35              | 1938    | 4-4 1/2 x 6 1/2                           | .018                                   | .018                                     | .018                                    | .018    | 10B  | 10A   | B                                       | .025            | .013              | TC                                    | Ret                                     | 12                             | 40                                  | 64                                    |   | GO   |
| Fairway 12                      | 1935-38 | 4-3 x 4                                   | .013                                   | .013                                     | .013                                    | .013    |  |   | B                                       | .020            | .013              | TC                                    | Ret                                     | 5 1/2                          | 14                                  | 16                                    |   | GK   |
| JOHN DEERE                      |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| D                               | 1930    | 2-6 1/2 x 7                               | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| GP                              | 1928-29 | 2-5 1/2 x 6                               | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| WT                              | 1929-30 | 2-5 1/2 x 6                               | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| WT                              | 1930-35 | 2-6 x 6                                   | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| GP                              | 1930-35 | 2-6 x 6                                   | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| Orchard                         | 1934    | 2-6 x 6                                   | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| O                               | 1931-35 | 2-6 x 6                                   | .030                                   | .030                                     | .030                                    | .030    | 20A  | 10A   | Front                                   | .028            | .020              | 30B                                   | Adv                                     | 7                              | 36                                  | *                                     | 55  | GKD  |
| A                               | 1937-38 | 2-5 1/2 x 6 1/2                           | .020                                   | .020                                     | .020                                    | .020    | 10A  | 5A  | Front                                   | .030            | .015              | TC                                    | Set                                     | 9 1/2                          | 32                                  | 28                                    | 55  | GKD  |
| B                               | 1934-38 | 2-4 1/2 x 5 1/4                           | .020                                   | .020                                     | .020                                    | .020    | 10A  | 5A  | Front                                   | .030            | .015              | TC                                    | Set                                     | 6 1/2                          | 20                                  | 20                                    | 54  | GKD  |
| D                               | 1931-38 | 2-6 1/2 x 7                               | .028                                   | .028                                     | .028                                    | .028    | 1 1/2 B                                    | 11 1/2 A                                      | Front                                   | .030            | .020              | TC                                    | Ret                                     | 13                             | 40                                  | 20                                    | 54  | GKD  |
| G                               | 1937-38 | 2-6 1/2 x 7                               | .020                                   | .020                                     | .020                                    | .020    | 10A  | 5A  | Front                                   | .030            | .015              | TC                                    | Ret                                     | 11                             | 44                                  | 36                                    | 54  | GKD  |
| A, AN, AW, AO, AR               |         | 2-5 1/2 x 6 1/2                           | .020                                   | .020                                     | .020                                    | .020    | FWM  |   | Front                                   | .030            | .015              | TC                                    |   | 9 1/2                          | 37 1/2                              | 32                                    |   | GKD  |
| B, BN, BW, BO, BR               |         | 2-4 1/2 x 5 1/2                           | .020                                   | .020                                     | .020                                    | .020    | FWM  |   | Front                                   | .030            | .015              | TC                                    |   | 7 1/2                          | 25                                  | 18                                    |   | GKD  |
| G, GM                           |         | 2-6 1/2 x 7                               | .020                                   | .020                                     | .020                                    | .020    | FWM  |   | Front                                   | .030            | .015              | TC                                    |   | 11                             | 44                                  | 36                                    |   | GKD  |
| H, HN                           |         | 2-3 1/2 x 5                               | .015                                   | .015                                     | .015                                    | .015    | FWM  |   | Front                                   | .030            | .015              | FWM                                   |   | 4 1/2                          | 22                                  | 11                                    |   | GKD  |
| LAUSON                          |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| S                               | 1930-35 | 4-4 1/2 x 6                               | .018                                   | .018                                     | .018                                    | .018    | 15B  | 5A  | A                                       | .020            | .013              | 5A                                    | Ret                                     | 6                              | 20                                  |                                       | 65  | G    |
| 6S                              | 1930-35 | 6-3 1/2 x 5                               | .013                                   | .013                                     | .013                                    | .013    | TC   | 5A  | A                                       | .025            | .015              | TC                                    | Ret                                     | 8                              | 22                                  |                                       | 70  | G    |
| 6T                              | 1930-35 | 6-4 1/2 x 6                               | .018                                   | .018                                     | .018                                    | .018    | 15B  | 5A  | A                                       | .020            | .013              | 5A                                    | Ret                                     | 6                              | 20                                  |                                       | 64  | G    |
| MASSEY-HARRIS                   |         |   |  |  |   |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |      |
| GP                              | 1932-37 | 4-4 x 4 1/2                               | .006                                   | .008                                     | .006                                    | .008    | 5A   |   | A                                       | .020            | .015              |                                       | Set                                     | 4                              | 16                                  | 17                                    |   | GKD  |
| 12-20                           | 1934    | 4-3 3/4 x 5 1/4                           | .040                                   | .040                                     | .040                                    | .040    |  | 12A   | A                                       | .025            | .015              | 35B                                   | Adv                                     | 12                             | 20                                  | 30                                    |   | GKD  |
| 24                              | 1934    | 4-4 1/2 x 5 1/4                           | .030                                   | .030                                     | .030                                    | .030    |  | 12A   | A                                       | .025            | .015              | 38B                                   | Adv                                     | 12                             | 24                                  | 44                                    |   | GKD  |
| 12                              | 1935    | 4-3 3/4 x 5 1/4                           | .040                                   | .040                                     | .040                                    | .040    |  | 12A   | A                                       | .025            | .015              | 35B                                   | Adv                                     | 12                             | 20                                  | 30                                    |   | GKD  |
| 25                              | 1935-38 | 4-4 1/2 x 5 1/4                           | .030                                   | .030                                     | .030                                    | .030    |  | 12A   | A                                       | .025            | .015              | 38B                                   | Adv                                     | 12                             | 24                                  | 44                                    |   | GKD  |
| FA                              | 1938    | 4-3 3/4 x 5 1/4                           | .030                                   | .030                                     | .030                                    | .030    |  | 12A   | A                                       | .025            | .015              | 35B                                   | Adv                                     | 12                             | 20                                  | 34                                    |   | GKD  |
| CH                              | 1938    | 4-3 3/4 x 5 1/4                           | .030                                   | .030                                     | .030                                    | .030    |  | 12A   | A                                       | .025            | .015              | 35B                                   | Adv                                     | 12                             | 20                                  | 34                                    |   | GKD  |
| Wallis Cert.                    | 1930-32 | 4-4 1/2 x 5 1/4                           | .03                                    | .03                                      | .0                                      | .0      |  | 12A   | A                                       | .025            | .015              | 38B                                   | Adv                                     | 12                             | 24                                  | 30                                    |   | GKD  |
| Wallis 12-20                    | 1931-32 | 4-3 3/4 x 5 1/4                           | .040                                   | .040                                     | .040                                    | .040    |  |   | A                                       | .025            | .015              | 35B                                   | Adv                                     | 12                             | 20                                  | 30                                    |   | GKD  |



# TRACTOR TUNE-UP AND REPAIR DATA

| MAKE<br>AND<br>MODEL                  | No. of<br>Cylinders<br>Bore and<br>Stroke | Operating<br>Tappet<br>Clearance       |  | VALVE TIMING                               |         |  |   | Piston and Rod Assembly<br>Removed from | IGNITION TIMING |                   |                                       |   | Crankcase Capacity<br>(Quarts) | Cooling System Capacity<br>(Quarts) | Transmission Oil<br>Capacity (Quarts) | Compression Pressure at<br>Cranking Speed | FUEL<br>N = Nat. Gas<br>B = Butane<br>G = Gasoline<br>K = Kerosene<br>D = Distillate<br>O = Oil |      |    |
|---------------------------------------|---|--|--|--|---------|--|---|---|-----------------|-------------------|---------------------------------------|---|--------------------------------|-------------------------------------|---------------------------------------|---|---|------|----|
|                                       |   | Inlet (Hot unless<br>specified by "C") | Exhaust (Hot unless<br>specified by "C") | Tappet<br>Clearance<br>for Valve<br>Timing |         | Inlet Valve Opens<br>(Degrees B or A T.C.) | Exhaust Valve Closes<br>(Degrees B or A T.C.) |   | Spark Plug Gap  | Breaker Point Gap | Spark Occurs<br>(Degrees B or A T.C.) | Breaker Housing<br>Advanced or Retarded |                                |                                     |                                       |   |   |      |    |
|                                       |   |  |  | Inlet                                      | Exhaust |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| MASSEY-HARRIS—Continued               |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| RC101, S101                           | 6-3 1/2 x 4 3/8                           | .008                                   | .012                                     | .008                                       | .012    |  |   |   |                 | .025              | .020                                  | .003A*                                  |                                | 5                                   | 18                                    | 24  | G   |      |    |
| 101 Junior                            | 4-3 1/2 x 4 3/8                           | .014                                   | .014                                     | .014                                       | .014    | TC   | TC  | A                                       |                 | .025              | .020                                  | FWM                                     |                                | 4                                   | 11                                    | 24  | G   |      |    |
| 101 Super                             | 6-3 1/2 x 4 3/8                           | .008                                   | .010                                     | .008                                       | .010    |  |   |   |                 | .025              | .020                                  | .003A*                                  |                                | 5                                   | 16                                    | 24  | G   |      |    |
| 102                                   | 6-3 1/2 x 4 3/8                           | .017                                   | .022                                     | .017                                       | .022    | TC   | TC  | A                                       |                 | .030              | .020                                  | TC                                      |                                | 5                                   | 19                                    | 24  | G   |      |    |
| 201                                   | 6-3 3/4 x 4 1/2                           | .008                                   | .012                                     | .008                                       | .012    |  |   |   |                 | .025              | .020                                  | .003A*                                  |                                | 5                                   | 18                                    | 64  | G   |      |    |
| 203                                   | 6-4 x 4 3/8                               | .022                                   | .022                                     | .022                                       | .022    | 6 1/2 B                                    | 6 1/2 A                                       |   |                 | .025              | .020                                  | FWM                                     |                                | 6                                   | 22                                    | 64  | GKD   |      |    |
| 81(1)                                 | 4-3 x 4 3/8                               | .014                                   | .014                                     | .014                                       | .014    | TC   | TC  | A                                       |                 | .025              | .020                                  | FWM                                     |                                | 4                                   | 11                                    | 8   | G   |      |    |
| McCORMICK-DEERING                     |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| 10-20                                 | 1930-36 4-4 1/4 x 5                       | .011                                   | .011                                     | .011                                       | .011    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 40                                    | 26  | GKD   |      |    |
| 30                                    | 1933 4-4 1/4 x 5                          | .017                                   | .017                                     | .017                                       | .017    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 44                                    | 32  | GKD   |      |    |
| W30                                   | 1934-36 4-4 1/4 x 5                       | .017                                   | .017                                     | .017                                       | .017    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 44                                    | 32  | GKD   |      |    |
| W12                                   | 1934-36 4-3 x 4                           | .013                                   | .013                                     | .013                                       | .013    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 5 1/2                               | 14                                    | 16  | GD  |      |    |
| O12                                   | 1934-36 4-3 x 4                           | .013                                   | .013                                     | .013                                       | .013    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 5 1/2                               | 14                                    | 16  | GD  |      |    |
| F12                                   | 1934-36 4-3 x 4                           | .013                                   | .013                                     | .013                                       | .013    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 5 1/2                               | 14                                    | 16  | GD  |      |    |
| F20                                   | 1935-36 4-3 3/4 x 5                       | .009                                   | .009                                     | .009                                       | .009    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 29                                    | 32  | GD  |      |    |
| F30                                   | 1934-36 4-4 1/4 x 5                       | .017                                   | .017                                     | .017                                       | .017    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 40                                    | 28  | GD  |      |    |
| T20                                   | 1933-36 4-3 3/4 x 5                       | .016                                   | .016                                     | .016                                       | .016    |  |   | A                                       |                 | .025              | .015                                  | TC                                      | Ret                            | 6                                   | 32                                    | 46  | GD  |      |    |
| TA40                                  | 1933-36 6-3 3/4 x 4 1/2                   | .016                                   | .016                                     | .016                                       | .016    | 10A  | 15A   | A                                       |                 | .020              | .020                                  | TC                                      | Ret                            | 10                                  | 48                                    | 64  | G   |      |    |
| TD40                                  | 1934-36 4-4 1/4 x 6 1/2                   | .015                                   | .015                                     | .015                                       | .015    | 10B  | 10A   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 12                                  | 56                                    | 60  | GO  |      |    |
| WA40                                  | 1936 6-3 3/4 x 4 1/2                      | .016                                   | .016                                     | .016                                       | .016    | 10A  | 15A   | B                                       |                 | .020              | .020                                  | TC                                      | Ret                            | 10                                  | 48                                    | 64  | G   |      |    |
| WD40                                  | 1936 4-4 1/4 x 6 1/2                      | .015                                   | .015                                     | .015                                       | .015    | 10B  | 10A   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 12                                  | 56                                    | 60  | GO  |      |    |
| O12                                   | 1937-38 4-3 x 4                           | .013                                   | .013                                     | .013                                       | .013    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 5 1/2                               | 14                                    | 16  | GD  |      |    |
| W12                                   | 1937-38 4-3 x 4                           | .013                                   | .013                                     | .013                                       | .013    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 5 1/2                               | 14                                    | 16  | GD  |      |    |
| 10-20                                 | 1937-38 4-4 1/4 x 5                       | .011                                   | .011                                     | .011                                       | .011    |  |   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 40                                    | 26  | GKD   |      |    |
| W30                                   | 1937-38 4-4 1/4 x 5                       | .017                                   | .017                                     | .017                                       | .017    |  |   | A                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 7                                   | 44                                    | 32  | GKD   |      |    |
| W40                                   | 1937-38 6-3 3/4 x 4 1/2                   | .016                                   | .016                                     | .016                                       | .016    | 10A  | 15A   | A                                       |                 | .020              | .020                                  | TC                                      | Ret                            | 9                                   | 48                                    | 60  | GKD   |      |    |
| WD40                                  | 1937-38 4-4 1/4 x 6 1/2                   | .018                                   | .018                                     | .018                                       | .018    | 10B  | 10A   | B                                       |                 | .025              | .013                                  | TC                                      | Ret                            | 12                                  | 56                                    | 60  | GO  |      |    |
| MINNEAPOLIS-MOLINE                    |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| Twin-City KT                          | 1928-35 4-4 1/4 x 5                       | .010                                   | .012                                     | .010                                       | .012    | 11A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 56  | GKD  |    |
| Twin City MT                          | 1930-35 4-4 1/4 x 5                       | .010                                   | .012                                     | .010                                       | .012    | 11A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 56  | GKD  |    |
| Twin City 27-44AT                     | 1920-37 4-5 1/2 x 6 3/4                   | .010                                   | .012                                     | .010                                       | .012    | 11A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Adv                            | 16                                  | 40                                    |   | 56  | GKD  |    |
| Twin City 21-32FT                     | 1925-36 4-4 1/4 x 6                       | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Adv                            | 10                                  | 34                                    |   | 56  | GKD  |    |
| Minneapolis 17-30B                    | 1932 4-4 1/4 x 7                          | .016                                   | .020                                     | .016                                       | .020    | 5A   | 10A   |   |                 | .030              | .015                                  | TC                                      | Ret                            | 5 1/2                               | 34                                    |   |   | GK   |    |
| Minneapolis 27-42                     | 1932 4-4 1/4 x 7                          | .016                                   | .020                                     | .016                                       | .020    | 5A   | 10A   |   |                 | .030              | .015                                  | TC                                      | Ret                            | 5 1/2                               | 34                                    |   |   | GK   |    |
| Minneapolis 17-30A                    | 1920-35 4-4 1/4 x 7                       | .016                                   | .020                                     | .016                                       | .020    | 5A   | 10A   | B or T                                  |                 | .030              | .015                                  | TC                                      | Ret                            | 5 1/2                               | 34                                    |   |   | GK   |    |
| Minneapolis 17-30B                    | 1926-35 4-4 1/4 x 7                       | .016                                   | .020                                     | .016                                       | .020    | 5A   | 10A   |   |                 | .030              | .015                                  | TC                                      | Ret                            | 5 1/2                               | 34                                    |   |   | GK   |    |
| Minneapolis 27-42                     | 1929-35 4-4 1/4 x 7                       | .016                                   | .020                                     | .016                                       | .020    | 5A   | 10A   |   |                 | .030              | .015                                  | TC                                      | Ret                            | 5 1/2                               | 34                                    |   |   | GK   |    |
| Twin City 17-28                       | 1933-35 4-4 1/4 x 6                       | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Adv                            | 12                                  | 40                                    |   | 56  | GKD  |    |
| Minneapolis-Moline KTA                | 1935-38 4-4 1/4 x 5                       | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 62  | GKD  |    |
| Minneapolis-Moline MTA                | 1935-37 4-4 1/4 x 5                       | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 62  | GKD  |    |
| Minneapolis-Moline JT                 | 1935-37 4-3 3/4 x 4 3/4                   | .010                                   | .012                                     | .010                                       | .012    | 8A   | 15A   | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 7                                   | 18                                    |   | 62  | GKD  |    |
| Minneapolis-Moline FTA                | 1937-38 4-4 1/4 x 6                       | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 10                                  | 34                                    |   | 62  | GKD  |    |
| Minneapolis-Moline AT                 | 1937 4-5 1/2 x 6 3/4                      | .010                                   | .012                                     | .010                                       | .012    | 11A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Adv                            | 16                                  | 40                                    |   | 56  | GKD  |    |
| Minneapolis-Moline RE                 | 1937 4-3 3/4 x 4 1/2                      | .012                                   | .014                                     | .012                                       | .014    | 11A  | 6A  | B or T                                  |                 | .030              | .012                                  | 21B                                     | Set                            | 7                                   | 14                                    |   | 66  | GDNB |    |
| Minneapolis-Moline Z                  | 1937-38 4-3 3/4 x 4 1/2                   | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 62  | GKD  |    |
| Minneapolis-Moline MTS                | 1938 4-4 1/4 x 5                          | .010                                   | .012                                     | .010                                       | .012    | 10A  | 6A  | B or T                                  |                 | .030              | .012                                  | 27B                                     | Set                            | 9                                   | 23                                    |   | 62  | GKD  |    |
| Minneapolis-Moline KE, KEA, KEC       | 1934-40 4-4 1/4 x 5                       | .012                                   | .014                                     | .012                                       | .014    |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| Minneapolis-Moline GT, GE, LE         | 1936-41 4-4 1/4 x 6                       | .012                                   | .014                                     | .012                                       | .014    | 4A   | 7A  |   |                 | .020              | .020                                  | 33B                                     |                                | 10                                  |                                       | 52  |   | GDNB |    |
| Minneapolis-Moline EE, RT             | 1939 4-3 3/4 x 4                          | .012                                   | .014                                     | .012                                       | .014    | 11A  | 6A  |   |                 | .022              | .020                                  | 21B                                     |                                | 7                                   |                                       | 18  |   | GDNB |    |
| Minneapolis-Moline KEF, UTS           | 1940 4-4 1/4 x 5                          | .012                                   | .014                                     | .012                                       | .014    | 4A   | 7A  | T                                       |                 | .030              | .020                                  | 30B                                     |                                | 9                                   |                                       |   |   | GDNB |    |
| Minneapolis-Moline CE                 | 1940 6-4 1/4 x 5                          | .012                                   | .014                                     | .012                                       | .014    | 11A  | 6A  |   |                 |                   |                                       | 33B                                     |                                | 14                                  |                                       |   |   | GDNB |    |
| Minneapolis-Moline HE                 | 1940 6-4 1/4 x 6                          | .012                                   | .014                                     | .012                                       | .014    | 11A  | 6A  |   |                 |                   |                                       | 32B                                     |                                | 14                                  |                                       |   |   | GDNB |    |
| Minneapolis-Moline ME                 | All 4-8 x 9                               | .020                                   | .020                                     | .020                                       | .020    | 9 1/2 A                                    | 9 1/2 A                                       |   |                 |                   |                                       | 32B                                     |                                | 28                                  |                                       |   |   | GDNB |    |
| Minneapolis-Moline NE                 | All 6-8 x 9                               | .020                                   | .020                                     | .020                                       | .020    | 9 1/2 A                                    | 9 1/2 A                                       |   |                 |                   |                                       | 32B                                     |                                | 32                                  |                                       |   |   | GDNB |    |
| MONARCH (See Allis-Chalmers)          |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| OLIVER                                |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| 28-44                                 | 1930-38 4-4 1/4 x 6 1/4                   | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | B or T                                  |                 | .025              | .015                                  | 32B                                     | Adv                            | 12                                  | 42                                    | 60  |   | 58   | GK |
| 18-28                                 | 1930-37 4-4 1/4 x 5 1/4                   | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | B or T                                  |                 | .025              | .015                                  | 32B                                     | Adv                            | 8                                   | 24                                    | 48  |   | 58   | GK |
| Standard Row Crop                     | 1930-37 4-4 1/4 x 5 1/4                   | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | B or T                                  |                 | .025              | .015                                  | 32B                                     | Adv                            | 8                                   | 24                                    | 48  |   | 58   | GK |
| Row Crop 70HC                         | 1935-38 6-3 1/4 x 4 3/8                   | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 22B                                     | Set                            | 5                                   | 18                                    | 26  | 110   | G    |    |
| Row Crop 70KD                         | 1935-38 6-3 1/4 x 4 3/8                   | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 23B                                     | Set                            | 5                                   | 18                                    | 26  | 70  | KD   |    |
| Standard 70HC                         | 1935-38 6-3 1/4 x 4 3/8                   | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 22B                                     | Set                            | 5                                   | 18                                    | 26  | 110   | G    |    |
| Standard 70KD                         | 1935-38 6-3 1/4 x 4 3/8                   | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 23B                                     | Set                            | 5                                   | 18                                    | 26  | 70  | KD   |    |
| Orchard 70HC                          | 1938 6-3 1/4 x 4 3/8                      | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 22B                                     | Set                            | 5                                   | 18                                    | 26  | 110   | G    |    |
| Orchard 70KD                          | 1938 6-3 1/4 x 4 3/8                      | .010                                   | .010                                     | .010                                       | .010    | TC   | TC  | A                                       |                 | .025              | .015                                  | 23B                                     | Set                            | 5                                   | 18                                    | 26  | 70  | KD   |    |
| Row Crop 80HC                         | 1938 4-4 1/4 x 5 1/4                      | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | A                                       |                 | .025              | .015                                  | 26B                                     | Set                            | 8                                   | 34                                    | 48  | 110   | G    |    |
| Row Crop 80KD                         | 1938 4-4 1/4 x 5 1/4                      | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | A                                       |                 | .025              | .015                                  | 26B                                     | Set                            | 8                                   | 34                                    | 48  | 76  | KD   |    |
| Standard 80HC                         | 1938 4-4 1/4 x 5 1/4                      | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | A                                       |                 | .025              | .015                                  | 26B                                     | Set                            | 8                                   | 34                                    | 48  | 110   | G    |    |
| Standard 80KD                         | 1938 4-4 1/4 x 5 1/4                      | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | A                                       |                 | .025              | .015                                  | 26B                                     | Set                            | 8                                   | 34                                    | 48  | 76  | KD   |    |
| Special                               | 1936-38 4-4 1/4 x 6 1/4                   | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | B or T                                  |                 | .025              | .015                                  | 32B                                     | Adv                            | 12                                  | 42                                    |   | 76  | G    |    |
| 99                                    | 1938 4-4 1/4 x 6 1/4                      | .012                                   | .015                                     | .012                                       | .015    | 10A  | 10A   | B or T                                  |                 | .025              | .015                                  | 32B                                     | Adv                            | 12                                  | 42                                    |   | 76  | G    |    |
| ROCK ISLAND                           |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| F                                     | 1930-33 4-4 1/4 x 6                       | .010                                   | .016                                     | .010                                       | .016    |  |   | B                                       |                 | .025              | .015                                  | TC                                      | Ret                            |                                     | 28                                    |   |   | GK   |    |
| FA                                    | 1931-34 4-4 1/4 x 6                       | .010                                   | .016                                     | .010                                       | .016    |  |   | B                                       |                 | .025              | .015                                  | TC                                      | Ret                            |                                     | 28                                    |   |   | GK   |    |
| G2                                    | 1933-34 4-4 1/4 x 5 3/4                   | .010                                   | .016                                     | .010                                       | .016    |  |   | B                                       |                 | .025              | .015                                  | TC                                      | Ret                            |                                     | 28                                    |   |   | GK   |    |
| SILVER KING (The Fate-Root-Heath Co.) |   |  |  |  |         |  |   |   |                 |                   |                                       |   |                                |                                     |                                       |   |   |      |    |
| Four Wheel                            | 1936-38 4-3 1/4 x 4                       | .006                                   | .008                                     | .006                                       | .008    | 5A   |   | A                                       |                 | .025              | .015*                                 | 14B                                     | Adv                            | 3 1/2                               | 9                                     | 10  | 88  | G    |    |
| Three Wheel                           | 1936-38 4-3 1/4 x 4                       | .006                                   | .008                                     | .006                                       | .008    | 5A   |   | A                                       |                 | .025              | .015*                                 | 14B                                     | Adv                            | 5                                   | 12                                    | 12  | 88  | G    |    |
| Four Wheel                            | 1940 4-3 1/4 x 4                          | .006                                   | .008                                     | .006                                       | .008    | 5A   | 5A  | A                                       |                 | .015              | .015                                  |   |                                | 3 1/2                               | 1                                     |   |   |      |    |



"The girdle salesman traded me four of them for our tires, and you know how hard it is to get a girdle nowadays."



**APPRECIATION.** Abraham Lembers, at one of his two gas stations in Detroit. He turns over the profits of this station to government to help defense because "America was good to me." He's a Russian immigrant.

**MOTORISTS AFOOT.** A work-bound group waits on a Los Angeles corner for a street car after a morning air-raid alarm had forced all forms of transit to take cover.



**WAR EFFORT.** It's considerable in the case of this Stephens College girl. And her efforts to master an airplane engine seem to be a strain on her instructor.



## NEWS

### RATIONED GASOLINE

AS yet no details have been announced as to quantities to be allowed under the gasoline-rationing that becomes effective soon in states along the Eastern seaboard and in Oregon and Washington. Opposition to the plan was voiced by Eastern dealers as soon as it was announced, but it is unlikely that rationing will be delayed on that account.

From the standpoint of the repair man, the amount of fuel to be allotted drivers is important not so much because of the revenue concerned but because higher quantities will permit more driving. Mileage is the breath of life to the service and repair shop.

Canada is in much the same position as the United States with regard to gasoline and it may be that American rationing will follow the Canadian plan which becomes effective April 1. The average Canadian is allowed 300 gallons of gasoline a year, but the allotment is increased for certain classes of essential owners, reaching a maximum of 2500 gallons for those engaged in the most

vital work. This seems a much more equitable method than a flat allowance for everyone, as was suggested here during the phoney gas shortage last summer.

Coupon books issued to Canadians bear the registration numbers of the cars for which they were issued, thus increasing the chance that each car will get the full quantity to which it is entitled and no more.

### WAR BUSINESS

AMID all the clamor for relief for small business, some automotive jobbers have stuffed cotton in their ears and solved at least some of their problems for themselves.

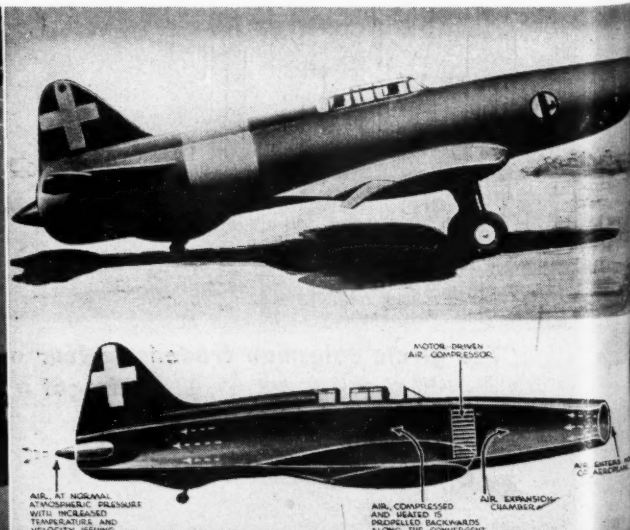
Everybody in business talks about getting into war work in some way but not everybody gets beyond talking and wishing. The jobbers in question did, and they did it in quite an unexpected way.

Small manufacturers that hope to obtain war work are urged by authorities to study the requirements of the military and visit the permanent and traveling exhibits of military

**BIKE PARK.** Increasing numbers of bicycles on the streets led this car-parking lot at Long Beach, Cal., to install a bike rack. Business was soon booming.



**HOT-AIR PLANE.** New Italian craft is propelled by a jet of compressed air discharged behind the tail. Photo through courtesy of "The Aeroplane," England.



## DETROIT LETTER

By ED WARNER

goods to see what they can make. The jobbers reversed the procedure.

They visited factories that were turning out war goods in their areas and took along their catalogs.

"We've got a lot of stuff in there," they told the factory men, "that you can use. Look it over and see."

The factory men did. And they found plenty they could use—hand tools, equipment, and supplies of many kinds. Naturally, they bought it from jobbers.

So these jobbers are, to all intents and purposes, in war work. They aren't producing arms, but they are supplying materials to war industries. It's a satisfactory arrangement all around.

### TIRE DEFLATION

**PRICE ADMINISTRATOR HENDERSON** acted just in time to keep the used-tire price situation from getting completely out of hand. With the vast majority of car owners unable to buy new tires or even to have their old tires retreaded, some of the quick-money boys were getting set for

In order that the nation's armed services can "keep 'em rolling, keep 'em flying and keep 'em shooting," General Motors has launched an extensive training and service program so that the planes, guns, tanks and trucks that it produces will be able to function efficiently in the field. The program, which calls for a \$5 million expenditure by GM this year, will require the maintenance of schools for Army and Navy instructors, who in turn will help train the thousands of mechanics needed to keep the tanks, trucks and planes in service. GM also will place its own engineers in the field, close to the battlefronts, to make operating reports on equipment in war use and to make suggestions for improvements in manufacture. The cor-

poration also will assist the Army and Navy in maintaining sufficient stocks of replacement parts in war areas so that planes and mobile units will not be put out of action for lack of a repair part. One general recently said that spare parts will win the war.

The three R's of modern warfare are "reliability, repair and replacement," according to C. E. McCuen, vice president in charge of engineering who is supervising the GM training and service program. General Motors does not see its responsibility end when an Allison aircraft engine comes off the production line for shipment to the Army Air Corps. GM also will help train the mechanics who service that engine when it is installed

(Continued on Page 78)

a killing. One filling station paid an owner \$100 for a secondhand set of four 7.00 x 15 white sidewall tires. What it expected to resell them for is anybody's guess. But, whatever it was, the resale price is a lot lower than it was before Henderson acted, and secondhand tires will necessarily

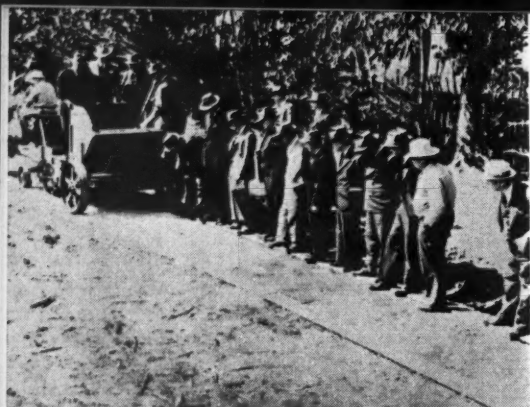
be placed within the reach of more car owners.

The maximum prices of used tires do not seem objectionable under the circumstances, even though in some cases they approximate the price of second-line new tires six months ago. Passenger-car tires are classified in

**IDLE RUBBER.** These tires, according to a copyrighted article in the *Philadelphia Inquirer* recently, were taken from trucks at an abandoned CCC camp in Pennsylvania and locked away in a warehouse, despite the rubber shortage and scarcity of tires.

**TRACTORS RUST.** While the WPB was calling for utilization of all surplus materials, the *Inquirer* article declared, tractors, along with road equipment and graders, were parked in open when the CCC camps closed and winter allowed to do its worst.





four groups according to wear. For a 6.00 x 16 tire of Class 1 quality, the maximum price is set at \$8.10. This is reduced to \$6.65 for Class 2, \$4.45 for Class 3, and \$1.50 for Class 4. The maximum price for secondhand passenger-car tubes is \$1.50.

Class 1 tires are those retaining 7/32 in. or more of tread. Class 2 includes those with more than 3/32 in. of tread but less than 7/32 in. Class 3 comprises tires that have been regrooved and have 3/32 in. of tread. Falling in Class 4 are bald tires in sufficiently good condition to be recapped or retreaded.

This classification is necessarily arbitrary, since some standard had to be found quickly. It is unfortunate, however, that some consideration was not given to the age of casings. A carcass resurrected from a graveyard five or six years after it was built, even though it retains most of its original tread, is not worth so much as a bald but newer tire.

Encouraging news about rubber was forthcoming from the OPA last month when it was announced that a limited number of recapped tires would be made available in April for war workers, farmers, salesmen, taxi drivers and owners of wholesale newspaper vehicles. Most of these classifications had been excluded in earlier rulings.

The quotas for April permit the sale of a higher ratio of retreads to new tires than was sold during last year. In April, 1941, of course, everybody who had the money bought new tires.

## TOO MUCH AIR

A WARNING is issued by the Goodyear Tire and Rubber Co. against excessive tire pressures as a means of conserving rubber.

Underinflation is a recognized foe of tire life, and rubber companies and servicemen alike have been correct in

urging that tires be kept inflated to the recommended pressures. However, there is danger, Goodyear points out, that some misinformed owners may reason that, if a little of anything is good, more must necessarily be better, but this is not true of tire inflation.

First of all, says Goodyear, tires that contain more air than necessary will bounce over uneven spots on the street or highway, resulting in a spinning action which has a buffing effect on the tire's tread. Too much air causes slippage between tire and road.

Second, overinflated tires are more susceptible to fabric breaks when they strike hard objects such as stones, raised bricks or other sharp bumps. Such fabric damage or breaks shorten the tire's life and can easily go undetected until they cause a flat or a blowout.

## DEALERS IN WAR

HERE and there an automobile dealer has been able to find a method of weathering these war-troubled times, even though the method is several leagues removed from the automobile business.

Addressing the Automobile Dealers' Association of Miami, Fla., recently, Cyrus McCormick, of the OPA, cited a number of instances where dealers have gone into war production. A Columbus, Ohio, dealer, he said, had converted his salesroom and shop into a school for machinists and a factory for producing small machine parts. At Pittsburgh, Pa., and Denver, Col., the cities' dealers engaged competent industrial engineers and legal advisers and contacted regional ordnance and procurement officials.

Converted dealer plants are turning out such a wide variety of war products as cadmium plating, bronze shafts and bushings, radio parts, fuses, and steel shafts.

(Continued on Page 125)

**AMERICAN RUBBER.** General Tire and Rubber Co. officials (top left) take part in planting of guayule seed at Salinas, Cal., to boost production of American-grown rubber.

**DOUBLE CROSS.** (Middle left) It is merely the design left on blacked-out traffic lights. The lights were recently tried out on lower Broadway in New York.

**TIRES FROM TREES.** But not rubber tires. Glen Conroad, Columbus, Ohio (left), with tire he recently made from wood. He says it is safe up to 15 miles an hour.

## WAR ECONOMY

(Continued from Page 25)

visible to use gasket cement to insure against the possibility of a blown cylinder-head gasket.

When reconditioning the valves, new ones should be used when the valve has been refaced until the edge is no longer rounded but presents virtually a knife-edge. Valve seats must be from 1/16 in. to 3/32 in. wide so as to provide ample area for transfer of heat from the valve to the water jacket and clearance between valve stems and guides must be less than .004 in.

Having established the compression, there remains carburetion and ignition which have to be checked in order to produce maximum economy. In both instances, rebuilt exchange units are available, but here again the mechanic must make a careful examination and ascertain whether a complete unit is advisable or whether maximum economy can be obtained by overhauling the unit in the shop. In this connection, repair kits are available for carburetors and fuel pumps, which in most instances will enable the mechanic to rebuild the unit in the shop. However, the time element must also be considered and, where this is an important factor, an exchange unit would be in order.

But, in every instance, the complete carbureting and ignition systems must be thoroughly checked. In the former, the fuel lines, fuel pump, air cleaner, and carburetor jets, choke, fuel level, economizer, air bleeds, etc., must be checked and, in the ignition system, the coil, breaker points, distributor shaft and bushing, condenser, vacuum and centrifugal advance must be tested. Breaker joints should be set on a test stand to insure proper cam angle and also to provide a check on the automatic advance.

A complete tune-up should also include a thorough cleaning of the cooling system so as to eliminate the possibility of any local hot spots. Of equal importance is checking the exhaust system to make sure there is no back pressure which would affect the economy of operation.

## KEEP 'EM NEW

(Continued from Page 24)

them no good to wait until next year or the next in the hope that they'll be able to turn them in and so save the cost of having them repainted. In the first place, there won't be any cars to trade them in for, and, in the second place, paint may be harder to get a few months hence. Paint manufacturers have huge stocks of lac on hand, but lac is obtained from the western Pacific, and there is no chance to re-new stocks.

Bright work on cars demands more attention than normally. On new cars, chrome-plated and stainless steel trim can be waxed to insure its lasting brightness. If, on older cars, the

bright work should tarnish or rust, there are polishes available to restore its luster. Trim that is beyond hope may be painted.

Inside the car, a wider opportunity for service exists for the average shop. The longer cars are driven, the more upholstery and interior trim will need attention. Seat covers, of course, are the most obvious preventative of soiled upholstery and a simple remedy for upholstery that has become excessively worn or discolored.

A number of compounds are available for cleaning upholstery. This is a type of service owners haven't been

in the habit of buying regularly but longer use of cars is bound to increase the need for it.

There's one other interior service war conditions have brought to the fore. That is moth-proofing of upholstery. Most owners probably will be surprised that an automotive shop can render such service, and they will be more surprised to learn how much protection modern preparations afford.

Appearance service won't keep a car operating longer, but it will give the owner a continued sense of pride in his car and help keep him satisfied with it.

### YOU CAN'T BEAT AMERICAN TEAMPLAY

\* ... that's the way Ray  
Hickerson, a Brunner drill  
press operator, puts it.



"Today, we're fighting for freedom. We Brunner men and the thousands of service station workers who keep cars and trucks rolling for defense combined with the men in other American plants will help keep the democratic system going. It's American team-play that the Axis *can't* beat."

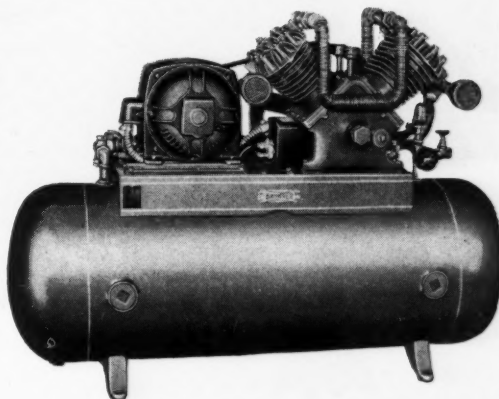
Brunner men, devoted Americans, are putting their finest efforts to turning out

dependable air compressors... service equipment that is essential for keeping the nation's vast transportation system rolling. Prospective purchasers of air compressors can approach Brunner units with complete confidence in their enduring value, and in their ability to serve you well for many years to come. Brunner Manufacturing Company, Utica, New York, U. S. A.



## COMPRESSORS

\* A company is nothing more than a group of men working toward a common goal. Put their personalities, beliefs and purposes together and you get company character.



Longer OIL CONTROL because

# 10<sup>up</sup> HAS TWO LIVES!

Reports of 50,000 miles and up of oil control effectiveness are common with Ramco 10-Up. Because 10-Up is the product of 21 years of specialized Ramco engineering of the spring ring principle of compression correction and oil control. Illustrated is one of the exclusive Ramco engineering developments... the Double Life Principle... one of the many advanced features of Ramco 10-Up which makes possible the Ramco 10,000 Mile Ring and Labor Guarantee that thousands are successfully using to increase ring jobs and used car sales.

See your Ramco Jobber or write Ramsey Accessories Mfg. Corp., 3693 Forest Park Blvd., St. Louis, Mo. In Canada: 364-370 Richmond Street, W., Toronto, Ontario.



★ During the break-in period, up to 10,000 miles, the inner ring contacts only the highly graphic cast-iron section allowing the steel segment's inherent tension to shape it to the cylinder wall contour.

★ As the cast-iron section wears in, the inner ring gradually begins to exert its stabilizing contact with the steel segment... and 10-Up's second life begins.

Copyright, 1967, Ramco



HI-POWER WITH

## RAMCO 10<sup>up</sup>

PISTON RINGS AND  
PISTON EXPANDERS

# SERVICE HINTS

## FROM THE FACTORIES

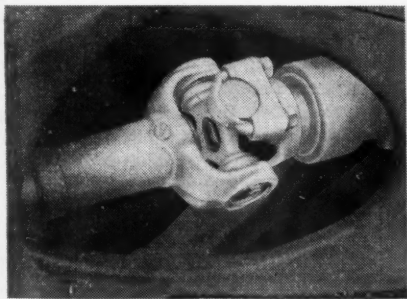
### ***Jumping Out of Gear***

If complaints are received of the 1942 Studebaker transmission jumping out of high or second speed gears, it may be necessary to install a new synchronizer sleeve, which is grooved at three points in each end. The grooves serve as detents to help hold the synchronizer in position.

The part number of the new sleeve for the Champion model is 516732, and for the Commander and President, 516733.

### ***Universal Joint Lubrication***

The Studebaker factory has called attention to the necessity for periodic lubrication of the needle bearing universal joint. It is recommended that the joint be repacked at 10,000-mile intervals, and more frequently if the car is subjected to unusual operation



such as continued high-speed driving or carrying unusually heavy loads.

It is necessary to disassemble this joint to lubricate the needle bearings properly. When the joint is reinstalled, the splines of the front yoke should be lubricated.

### ***Door Scratches Paint***

If the edge of the front door of the 1942 Dodge scratches the paint on the body when the door is opened, loosen the hinges and raise the door about 1/16 in., which will provide sufficient clearance.

### ***Brake Noise***

A snapping noise in the brakes of a 1941 Dodge, particularly when the brakes are applied as the car is going around a corner, may be caused by a feather edge on the brake-shoe adjusting cam, which has cut a

groove in the brake shoe. Any side-wise movement of the brake shoe causes the feather edge to snap out of the groove and make a noise.

To correct this condition, smooth out the groove with a round file, and remove the feather edge from the adjusting cam.

### ***Adjusting Wheel Bearings***

In the general field of automotive service, mechanics are quite apt to overlook the necessity of properly adjusting front-wheel bearings unless some particular operation makes necessary the removal of the front wheels.

A recent Pontiac service bulletin points out that these bearings should be adjusted periodically to prevent excessive wear.

The recommended procedure for adjusting wheel bearings is to tighten the nut first to insure that all parts are properly seated. Then back the nut off until the first indication of looseness is apparent. This is usually determined by grasping the wheel at top and bottom, and shaking. From this point, tighten the nut to the next point at which the cotter pin will pass through the castellations in the nut and the hole in the end of the spindle.

Every time a car is up on the lift, make it a point to inspect the front-wheel bearings for proper adjustment.

### ***Care of Chromium Parts***

If chromium-plated parts of a car become affected with rust they can be cleaned with Bon Ami and water. Then give those parts a coating of body wax to prevent further rust accumulation.

### ***Radio Noise***

If an unusual noise, similar to very bad atmospheric static, occurs in the radio of a 1942 Oldsmobile, it may be caused by the under-hood light. The mercury in the light switch moves when the car is traveling over a rough road, causing the light to flash on and off.

This condition can be corrected by raising the hood to the full open position, and bending the under-hood light bracket so that the light just comes on when the hood is in the full open position.

**RE-POWER**

*with*

**RAMCO**  
**10**  
**up**

IT BRIDGES THE GAP!

## BRAKE LINING

(Continued from Page 20)

It is quite possible, however, that under certain conditions a perfectly satisfactory job could be done by relining only those shoes which show the greatest wear. Naturally, the mechanic will have to exercise his best judgment when deciding whether the lining is suitable for further service, always remembering that it is poor economy to save one part at the cost of another, and that, with the

scarcity of labor that exists today, it would not be very economical of time, material or labor to reline the front brakes today and then have the car return in a few weeks time for a similar job on the rear wheels.

Generally speaking, if the rivet head is within 1/32 in. of the surface of the lining, the lining should be replaced. Lining with only that much useful life remaining is too close to the border-line of drum scoring to warrant continuing it in service. On the other hand, if the lining shows that it has full-surface contact with the drum, and the rivet heads are

1/16 in. below the surface, it is reasonable to expect that it will deliver a few thousand miles more of satisfactory service before replacement is necessary.

In all cases, however, shoes showing an equal amount of wear should be used in pairs so that it will be possible to get an equalized brake adjustment. A shoe having only half its average life remaining should not be used with a new shoe. Such a set-up would make it difficult to obtain an equalized adjustment, and might result in causing excessive wear on the new lining, excessive tire wear and generally unsatisfactory braking.

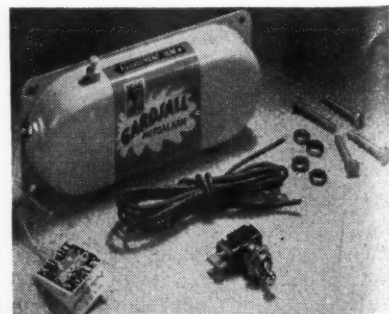
Another enemy of brake lining is grease, grease that leaks past the grease retainers and gets on the lining. A good preventive operation is to pull the wheels and examine the backing plates for evidence of leaking retainers. If any are found, they should be replaced with new ones. Lining that has once had grease on it cannot be satisfactorily cleaned, and has to be thrown away.

The brake hydraulic system also should be checked for leaks, and corrections made if any are found. And don't forget that flushing the system with alcohol will clean out any sediment which may have collected in the cylinders and lines, and help to prolong the life of the rubber piston cups.

By following these suggestions for preventive maintenance, and taking advantage of those cases in which a partial reline job can be done without sacrificing safety or leading to other conditions of excessive wear, the available supply of brake lining can be made to stretch out to cover more cars.

## Auto Alarm

To guard against theft, Knight Morley Corp., 620 East Hancock Ave., Detroit, Mich., has announced an automatic electric alarm for installation on any automobile. Installation is easy, and requires only a few minutes. The alarm system is connected to the horn, and causes the horn to blow intermittently and keeps it blowing for 15 seconds after anyone touches any part of the car. It is controlled by a switch which enables the owner to turn the alarm off while the car is in use.



**EVERY BEARING YOU SAVE** today is a bearing saved for **VICTORY**. For bearings are a **VITAL** defense need. They should be washed, dried and repacked at least every 5,000 miles to prevent abnormal wear. Keep them clean, that **"Keeps 'em Rolling"**.

To do a "factory job" of washing, drying and repacking bearings, service men are buying "Croft" equipment. It pays big dividends in time and labor and in longer bearing life. Ahlberg jobbers can supply you with this scientifically designed bearing service equipment.

Of course, when bearings must be replaced use Ahlberg Ground Ball Bearings. Scientifically re-processed and guaranteed to give new bearing performance. Ahlberg Ground Bearings have been a standard with large fleets and bus operators for thirty-four years.

Save all worn  
Ball Bearings  
for reprocessing  
the  
**AGB Way**

Power washing  
removes every  
trace of old lubri-  
cant and dirt.

\*\*\*

Compressed air  
blast blows the  
bearing perfectly  
clean and dry.

\*\*\*

New lubricant  
forced into every  
part of the bear-  
ing.



**WASHES**



**DRIES**



**RE-PACKS**

**AHLBERG**  
BEARING COMPANY  
Manufacturers of (GJB) Master Ball Bearings

★ 3028 WEST 47th STREET • CHICAGO, ILL. ★

Out West at PRECISION BEARINGS, INC. Los Angeles



GRANT E. HAYES

Studebaker fully recognizes its responsibility to its dealers and is vigorously carrying on a comprehensive program designed to assist them in every way possible. This spirit of cooperation should prove valuable to Studebaker dealers, not only in this emergency but in the years to come. Studebaker is proud of its reputation as a producer of top quality motor cars. And it is especially proud that the qualities on which that reputation was established are now devoted exclusively to its assignments in the arming of the nation.

*"Studebaker  
co-operation is  
one of my  
biggest assets"*

SCORES of other Studebaker dealers echo the sentiments of Grant E. Hayes, Studebaker distributor in Salt Lake City, Utah. He writes:

"The recent meeting which Studebaker held in Salt Lake City, made me realize more than ever that my organization can adjust itself successfully to the changed conditions that prevail today.

"We have always endeavored to operate a Service Department that would be a credit to Studebaker. Today, with your help, we are reaping the benefits of our constant efforts to increase sales in this department.

"I wish to congratulate Studebaker on the splendid program they have outlined for their dealers. Let's have more of these meetings."

☆ **FOR AMERICA'S VICTORY** ☆

Studebaker is building an unlimited quantity of airplane engines, military trucks and other matériel



**STUDEBAKER...THE GREAT INDEPENDENT**

## LONGERTIRE LIFE

(Continued from Page 21)

car down to 40 miles per hour if they would get the most out of their tires. Warn against "jack rabbit" starts and emergency brake applications, turning corners too fast, and bumping the curb when parking. All these are points which the owner alone can control, and a lot of fellows will have to acquire new driving habits if they want to prolong the life of their tires.

Switching the tires from front to

rear—right front to left rear, left front to right rear—will help to equalize the wear.

When the car comes in for an inflation check or for an alinement check, examine each tire for surface cuts in the tread or sidewall, and suggest that these places be repaired. Dirt and water will work into the cuts and weaken the fabric unless these cuts are sealed. Pick out pebbles that are imbedded in the tread pattern before they have time to injure the fabric by exerting a constant pressure in that one particular spot.

## Smash-Proof

### Efficiency

is the watchword these days!!

INCREASE THE EFFICIENCY of your shop by the addition of a few SMASHPROOF creepers.

Probably no other item of equipment will return so much for so little invested.

ASK ANY MECHANIC who has used one, and he will tell you why SMASHPROOF is the standard for the industry.

**GUARANTEED!**



Genuine SMASHPROOF creepers are carried in stock by most good jobbers. If your jobber does not have them write to us for name of our jobber nearest you.

**HULBERT CREEPER COMPANY**  
ASHTABULA, OHIO



"The police are finding fault with the way you taught me to drive, John. You'd better come right down to defend yourself."

Before the tread pattern is entirely worn away, it is advisable to have the tire regrooved. This restores the safety features of the tread and contributes to better cooling of the tire.

Another factor which has a direct bearing on tire wear is the condition of the shock absorbers. If they are not functioning properly, the tires will not hold the road, but will bounce. When a tire leaves the road, it continues to spin while in the air and then, when it makes contact with the road again, a scuffing action takes place. This scuffing, of course, wears off rubber quickly. Shock absorbers therefore should be inspected every 5000 miles, filled with fluid and tested for proper action.

Proper wheel balance is another point to be given careful attention, and is another example of where the shop with front wheel alining equipment can give customers' cars the kind of attention they need to keep them running. Wheels that are out of balance cause shimmy at high speed, producing a bouncing condition similar to the action produced by defective shock absorbers. Irregular and spotty tire wear results. Under present conditions, with many cars running on retreaded tires and tires which have been repaired, wheel balance is doubly important as a means of preventing excessive tire wear.

#### Joins Varnish Firm

J. D. Van Valkenburgh has been appointed assistant to the president of Irvington Varnish and Insulator Co., Irvington, N. J. For the past several years Mr. Van Valkenburgh has been associated with the Johns-Manville Corp., New York.

## ELECTRIC TUNE-UP

(Continued from Page 22)

Check the wire connections to coil, ammeter and electrical accessories on the instrument panel to be sure they are tight. Examine the low tension wire to the distributor, and the spark plug cables and high tension wire. If the terminals are bad, or the cable insulation is cracked, those wires should be repaired. In some cases, it may be possible to install new terminals, while in others the complete wire assembly may have to be replaced. While ordinarily it is the practice to replace spark-plug wires in complete sets, present-day conditions justify the mechanic in using his best judgment when recommending parts replacement, and, if in his opinion only one or two wires are unserviceable, economy and conservation both are being served if only those wires are replaced.

The same procedure can be followed in the case of distributor points and spark plugs. The breaker points should be clean, properly spaced, and alined so that they have full-surface contact. If the points appear to be in good condition except for being slightly pitted, perhaps touching them up with a file and readjusting the gap will make them fit for further service before it becomes necessary to replace them. Likewise, more frequent attention to cleaning and gapping spark plugs will prolong the life of these units.

Headlights come in for their share of attention in any electrical check-up. Terminals and switch connections should be checked, cleaned and tightened. Headlights should be properly aimed to give the car owner the benefit of proper visibility for night driving.

## LUBRICATION

(Continued from Page 23)

miles. If it hasn't, persuade the owner to let you install one. Every particle of foreign matter that finds its way into an engine hastens the day when the car will be laid up, the owner deprived of transportation, and the service man deprived of one car to service.

For his part, the serviceman ought to be prepared to do the best lubrication job he possibly can. A few points, such as the cowl-ventilator control, speedometer cable, carburetor accelerating-pump arm, and parking-brake linkage, are occasionally overlooked. If you want to keep your customer's car properly lubricated and running, you won't overlook them.

Of course, you can't do a thorough job for a cut-rate price. Owners, for-

tunately, are not so much interested in chiseling on price as they are in buying assurance that their cars will be running a year—even two or three years—from now.

And every car you keep rolling is a customer for YOUR shop.

### Catalogs Pared

Since the formal establishment last May of a special department for aiding manufacturers in simplifying and reducing their catalogs, the Motor and Equipment Wholesalers Association have made marked progress in this work.

W. H. Boney, manager of this MEWA Catalog Department, released recently a breakdown of the progress that has been shown in getting automotive after-market manufacturers to prepare more compact catalogs. Boney states, "since March of 1941 to March of 1942, 52 leading manufacturers have reduced the size of their jobber catalogs from a total of 3948 pages to 1699 pages which shows a saving of 2249 pages. These same catalogs have been reduced in weight from a total of 29½ pounds to only 13¼ pounds, or a total saving in weight of 16½ pounds."



For 32 years, McQuay-Norris has been manufacturing precision parts for motors used in passenger cars, trucks and tractors. In addition to making automotive replacement parts, we are now direct contractors to the Army and Navy and subcontractors on critical precision parts for aircraft, tanks, scout cars and trucks.

**McQUAY-NORRIS MANUFACTURING CO.**

*Let's keep cars, trucks and tractors rolling!*

# "I'M BUILDING MY REPUTATION with ...

## LEGALLY SPEAKING

A lawyer's interpretation of Federal and local court decisions of interest to repairmen, presented each month

By C. R. ROSENBERG, JR.

### Ending Contract by "Consent"

A local man had a contract for the exclusive sales agency for a manufacturer's products in certain territory. In the middle of the year, the manufacturer notified him that the contract would be terminated at the end of the calendar year. Thereafter the agent corresponded and negotiated with the manufacturer relative to his compensation and the handling of the territorial business until the end of the year. Eventually the agent sued the manufacturer for alleged breach of the contract, claiming that the manufacturer did not have the right to end it at the time and in the manner in which it was done.

The federal court, however, thought that the agent's dealings and negotiations with the manufacturer after the notice indicated that he had "acquiesced" in the ending of the contract.

"Contracts may always be terminated by mutual consent," said the court, "and there is ample evidence to establish the fact of such mutual consent. While the representative apparently did not plan to give up the territory and was quite surprised at the action of the manufacturer in notifying him of the termination of his contract, the oral evidence and the letters establish the fact that he acquiesced in its termination."

In law, a failure definitely to object

to a situation may be construed as "acquiescence," which in turn is equivalent to "consent." Thus you may find you have "consented" to something to which you are bitterly opposed. Moral: If you don't consent to it, object to it, protest against it, say NO in very definite language. (*Schmitt vs. Continental*, 116 *Federal Reporter*, second series, 779).

### Beware of Trap Doors!

A trap door in a repairman's place of business must be protected and guarded with the utmost care. Otherwise, the repairman may find himself on the wrong end of a personal injury suit. That is what happened in a recent Connecticut case.

A woman customer entered a business place where she had often dealt before. She made a purchase from the proprietor just inside the entrance and then said she would like to look at some other items. She walked toward the rear of the room, looking at goods on display as she proceeded. Toward the rear, a trap door in the floor stood open, and the proprietor stationed himself near the opening to prevent her falling in. He noticed that his customer was looking at displayed goods as she approached the opening and that she did not see it.

In response to a call from another customer he left his position and walked toward the front of the room,



## McQUAY-NORRIS

ALTINIZED

*Engineered Set*

## PISTON RINGS

*It's the sure way because  
McQuay-Norris is...*

*No. 1*

In the industry with a 32-year record of engineering achievement and service to the repair trade!

*No. 1*

In performance because with McQuay-Norris engineering is a vital principle not just a catch word!

*No. 1*

In Engineering Service—blueprint instruction and practical guides that are insurance against come-back jobs!

## McQUAY-NORRIS



leaving the opening unprotected and without warning the woman. She continued on, unaware of the danger, and fell into the open trap door. Serious injuries resulted, for which the customer brought suit.

To the argument that the customer's own negligence and inattention contributed to the injuries, the Connecticut court said:

"It is reasonable to infer that on her frequent previous visits to the place, the trap door was closed so that what had then been a safe floor had become a trap and place of danger which she had had no opportunity to discover; and it could properly be inferred that she was warranted in assuming that the proprietor, who was present and waiting on her, would warn her of any such hazard if it existed and that she was warranted in directing her attention to the displayed goods rather than to the floor. She had a right to assume that the floor was reasonably safe to walk upon."

A customer entering a repairman's place of business has a right to assume that it is maintained in a safe condition. It is not ordinarily the customer's duty to be on the look-out for hazards, but the repairman's duty to warn the customer of any dangers on his business premises.

Two good rules for repairmen:

First, keep customers and others away from all parts of the place where dangers exist;

Second, if that is not 100 per cent possible, make sure that customers and others are duly warned and protected against any hazards to which they may be exposed. (*Zoccali vs. Carfi*, 20 *Atlantic Reporter*, second series, 728).

## Liquidated Damages

In some contracts it's important that the repairman entering into the deal know exactly how much financial redress he is to get in the event that the other party to the contract "falls down." This may be taken care of by inserting in the contract a clause reading substantially like this:

"It is understood and agreed that in the event of a default on the part of the party of the first part by failure to deliver or otherwise under the terms of this contract, the said party of the first part shall be liable to the party of the second part in the sum of one thousand dollars (or whatever amount may be inserted) as liquidated damages."

"Liquidated damages" means an amount agreed upon between the parties which one is to receive in case of default by the other. A "liquidated damages" clause is particularly desirable where the nature of the contract is such that it would be difficult for one of the parties to show just what loss he suffered by a default on the part of the other.

As a Texas court put it in a recent case:

"Where it is certain that damages will flow, and where it is certain they cannot be accurately measured, or where it appears their ascertainment will be difficult, the best reasons exist for respecting the agreement of the parties in advance upon a sum mutually satisfactory."

But if performance of the contract be made legally impossible—by government priority rules, for example—there's no liability for failure to perform. (*White vs. Wilbanks*, 144 *Southwestern Reporter*, second series, 941.)

## BE No. 1 IN YOUR COMMUNITY!

Now is the time for you to build your reputation as the piston ring expert in your community! Thousands of smart repairmen have done it elsewhere by using only McQuay-Norris Altinized Engineered Sets! There's a Set of these famous rings specifically engineered for each make and model of car. Use Engineered Sets and your volume and profits will grow with your reputation!



Y-NORRIS MANUFACTURING CO.  
Piston Ring Headquarters

## DETROIT LETTER

(Continued from Page 67)

in a Bell Airacobra. Allison engineers already are on hand as observers in Australia and England and other battle areas where Allison-powered planes happen to be in action. And GM also will see to it, with the co-operation of its overseas organization, that Allison spare parts are kept available in these far battle outposts so that for lack of a piston the United Nations will not be minus the services of a potent fighter plane.

General Motors will operate schools to train Army and Navy instructors in the intricacies of 10 GM-designed products, including trucks, Diesel engines, tanks, Allison airplane engines and propellers. GM also will train instructors in the functions of 10 other war products which it is making but which are not of its own design. These include radial aircraft engines, machine guns, anti-aircraft guns, airplanes and torpedoes. Schools for Army instructors have been in operation for some time on Chevrolet trucks and Allison engines.

The Allison Division already has

given instruction to more than 800 Americans, Canadians, British, New Zealanders and Chinese. These men, after one to three months' training, are now instructors in their own right. The Allison school has a capacity of 71 men per month but this is due for expansion. With President Roosevelt's program for 60,000 planes this year due to grow to 125,000 planes to be produced in 1943, the need for enough mechanics to provide adequate ground crews is staggering.

General Motors also will cooperate with the Armored Force at Fort Knox, Ky., so that the tanks, armored scout cars and other combat vehicles will have sufficient trained mechanics on hand to keep them moving. The GM Institute at Flint is slated to train 25 men per month as Diesel engine instructors, because the new M-4 tanks to be built by Fisher Body will be Diesel-powered. Schools to train instructors in the driving, routine maintenance and operation of light and medium tanks to be produced by Cadillac and Fisher Body also will be set up in the near future.

Each GM manufacturing division will be urged to set up its own engineer observer service. The corporation also will establish its own service which will place one engineer observer in each Army area and one in each of the major theaters of war. Thus engineers will be on hand to watch GM Diesel engines perform in U. S. submarines operating out of Australian ports, to see Allison engines operate under adverse climatic conditions in the Libyan desert, to examine Chevrolet trucks driving over Irish roads and to inspect Oerlikon anti-aircraft guns as they help the U. S. and Britain keep the merchant-ship sea lines open in the Battle of the Atlantic.

General Motors is not alone in seeing that its war material receives proper service and that Army men are taught how to operate it correctly. Chrysler and Ford have operated schools for training Army instructors in truck maintenance for more than a year. Packard has engineering specialists who cooperate with the Navy in watching the performance of the powerful Packard marine engines that send Uncle Sam's patrol torpedo boat fleet speeding across the water at more than 50 m.p.h. A Packard engineer was on such assignment at Pearl Harbor when the Japanese attacked on Dec. 7.

On the civilian production side, General Motors is looking ahead to the post-war period with the recent announcement that GM dealers who keep going through the slim months of rationing will be rewarded when peace comes. As recompense for accepting the responsibility of maintaining service facilities during the war period, GM dealers still in business will receive priority on car shipments

(Continued on Page 82)

## RESEARCH by Fel-Pro makes the DIFFERENCE



● These special qualities of Fel-Pro Gaskets—which enable them to resist the severest service demands of modern motors—are the result of Fel-Pro's long experience in developing gaskets to meet all possible requirements. Give your customers the benefit of this experience. Write for details of Fel-Pro's Display Panels and Catalog of Complete Gasket Line.

*Research* is the Key to Fel-Pro Success In Serving Industry, The Car Maker and The Automobile Replacement Field.

*Gaskets*

PUMP PACKING  
GREASE RETAINERS

FELT PRODUCTS MFG. CO., 1510 CARROLL AV., CHICAGO, ILL.

# A Message of Importance to Millions

A TIMELY SUGGESTION for OWNERS of CARS and TRUCKS

Be Patriotic!

Conserve!

## TAKE CARE of YOUR HYDRAULIC BRAKES

and your brakes, tires and car will last longer

Follow these simple recommendations:

★ **DRIVE SLOWER.** You'll find you'll have fewer occasions to apply the brakes, and you'll find it easier to stop the car. The result will be less wear on the braking mechanism.

★ **DON'T JAM DOWN on BRAKES** except for an emergency stop. Quick stops from high speeds create excessive heat in the braking system and shorten the life of the tires. Gradual application of brakes avoids creation of high-pressure "sledge hammer blows" within the braking system. Sane braking will assure long, dependable performance of all parts which make up this important system in your car.

★ **SHIFT TO LOWER GEAR** when going down steep hills. Let engine do part of the braking. You'll keep the brake drums cooler, cause less wear on parts, and will reserve full retarding power of brake until needed.

★ **CHECK BRAKE PEDAL.** The brakes need adjustment or additional brake fluid is required to the brake system if the brake pedal can be depressed within an inch of the floor board. If brake pedal action produces a soft, spongy feeling, the brake system should be "bled" to eliminate air.

★ **BRAKE FLUID LEVEL** in the master cylinder of the brake system should be checked at every lubrication period. Fluid should be added if the reservoir of the master cylinder is less than half full.

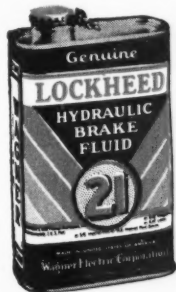
★ **HAVE WHEELS PULLED** at least once a year. This should be done by a brake expert. His inspection may disclose wear and minor trouble which can be easily and inexpensively corrected before serious trouble occurs. He may find that brake wheel cylinders and parts need attention, or that the brake lining is badly worn. He will also inspect the master cylinder.

There's an expert brake serviceman near you. Better see him NOW.

★ **LOOK FOR A WAGNER SERVICE SIGN.** Drive in the shop or station displaying this red, white and blue sign. Ask the serviceman to check the brake system "the Wagner way."



If fluid is needed--FOR SAFETY'S SAKE specify **WAGNER LOCKHEED No. 21 HYDRAULIC BRAKE FLUID**



No. 21 is recommended for all hydraulic brakes. It retains its highly efficient qualities under all driving conditions. It completely and properly mixes with all other approved fluids, furnishes necessary lubrication for working parts of the hydraulic brake system, and in general, preserves the essential characteristics of the entire system.

Behind this quality product are sixteen years of Wagner development and research. No. 21 is used by car manufacturers, and is recommended for the service needs of all cars and trucks having hydraulic brakes.

For safety's sake—why not have your car checked TODAY! There is a station near you. Automotive Parts Division, WAGNER ELECTRIC CORPORATION 6400 Plymouth Avenue, St. Louis, Mo., U. S. A. (In Canada: Wagner Brake Service Company, Ltd., Toronto).

# Wagner

LOCKHEED HYDRAULIC BRAKE PARTS and FLUID... AIR BRAKES...CoMaX BRAKE LINING...NoRoL...TACHOGRAPH

## WAGNER ADS in COLLIER'S and SAT. EVE. POST

call the public's attention to the fact that **PROPER MAINTENANCE of BRAKES makes cars and trucks last longer**

Millions of people, including many in YOUR community, will see the next Wagner half-page red, white and blue ad appearing in the April 25th issue of COLLIER'S (circulation over 2,900,000 copies)... This timely ad is reproduced in miniature at the left... A similar Wagner ad in colors will appear in the May 16th issue of the SATURDAY EVENING POST (circulation over 3,350,000 copies).

Wagner ads are telling people how to make their brakes last longer—and you can do your part by efficiently performing the service required for proper maintenance of brakes.

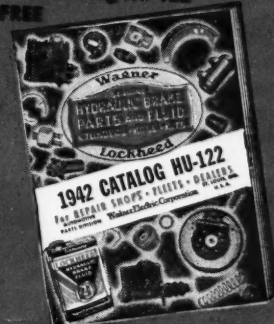
There is a Wagner jobber near you who can supply you with Wagner Lockheed Hydraulic Brake Fluid. He can also supply Wagner Lockheed Hydraulic Brake Parts for repairing brakes on all makes of cars and trucks... To procure trade helps, sign the coupon and mail it to us.

Display this HU-208 metal flange sign



For Safety and Maximum Brake Performance

Get 1942 Catalog HU-122 FREE



### Clip and Mail Coupon Today

AUTOMOTIVE PARTS DIVISION MA H42-9  
**Wagner Electric Corporation**  
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.

☐ Send details on No. 21 Fluid, ☐ Send FREE Catalog HU-122.  
☐ Send FREE Flange Sign HU-208.

Name and Position \_\_\_\_\_

Firm \_\_\_\_\_

Address \_\_\_\_\_

City and State \_\_\_\_\_

I Buy My Parts From \_\_\_\_\_

# SHOP KINKS

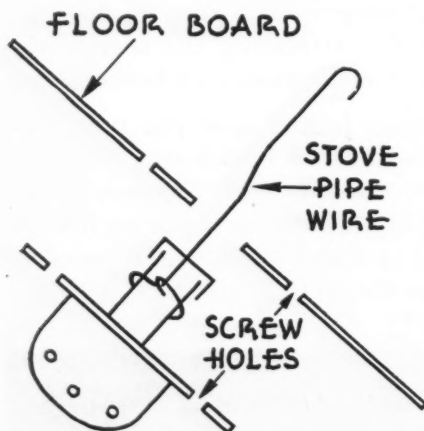


Here's your chance to pick up a little cigaret money. We'll pay three bucks (\$3.00) for every Shop Kink accepted and printed. So send 'em in to us—some short cut you use in doing a job easier and quicker than the other fellow—some special tool you made when you couldn't buy one to do the job—and we'll do the rest. Incidentally we won't accept any that have previously appeared in any other automotive publication. Here are some that were accepted this month:

## INSTALLING SWITCH

Dimmer switches on most cars are hard to install because of the cramped space in which they are located, usually between the instrument-panel brace and the toe board.

An easy way to do this job is to run a piece of stove pipe wire through



the hole from the driver's compartment where the foot switch is to be located. Then loop the lower end of the wire around the shank of the dimmer switch. Connect the light wires to the switch, and then pull the switch up through the hole with the piece of wire you attached to it. It is easy enough to hold it in place once the shank of the switch is through the hole, and then you can

start the attaching screws with your fingers to keep it there, tightening the screws later with a screw driver. *Emil J. Novak, 2215 South 13th St., Omaha, Neb.*

## MAGNETO TESTING

It is difficult to find a means of driving a magneto so it can be tested, unless you happen to have a special test stand.

I have found that my lathe makes an ideal drive for testing the magneto. All that is necessary is to build a stand to mount the magneto on. The stand is made so it will clamp on the ways, and is high enough to permit the magneto drive to be on a line with the center of the headstock spindle. I made two such mounting brackets, one for the base-mounted type of magneto, and one for the flange-mounted type.

I welded a piece of 5/16-in. key stock to the end of a piece of 3/4 in. shafting for the drive shaft which fits into the headstock, and attach the type of drive disc that fits the magneto drive coupling. I made the spark gap tester out of the plastic panel from an old radio.—*Ivo V. Pennington, Wauneta, Neb.*

## REPLACING WIRES

It is sometimes difficult to replace spark plug wires on those engines which have the wires housed in a metal tube or conduit. I make the

job easy by putting the end of the new wire in the plug terminal of the old wire, before the old wire is removed. Then, after fastening the new wire in the terminal, I pull the old wire out of the tube, drawing the new wire in at the same time. This is particularly helpful when there are several wires bunched together in the same tube.—*John W. Libb, Jr., 339 W. Main St., Glassboro, N. J.*

## SALVAGING CORK GASKETS

Cork gaskets which have been in stock for some time dry out and shrink so that the bolt holes do not line up.

Instead of throwing the gasket away, I soak it in water for a few minutes to make it more pliable, and then put it between the jaws of a vise and squeeze it along its entire length. This will stretch it out to its original size.—*George Krause, Henderson, Minn.*

## REMOVING HOOD CENTER ROD

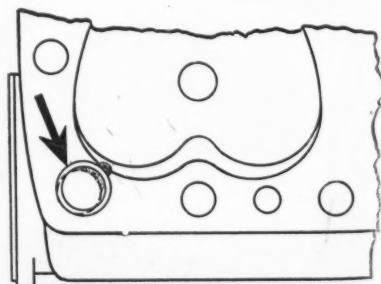
Sometimes, for the purpose of painting or metal repairing, it is necessary to remove the rod which runs through the center of the hood and acts as a hinge for the two halves. These rods are often stuck so that they are very difficult to remove.

I first start the rod out with a punch, moving it about one inch. Then I chuck the rod in a 1/4-in. drill, start the drill and pull at the same time. This will turn the rod in the hood, and it will come out very easily.—*Bruce K. Firth, 502 Phoenix Ave., Elmira, N. Y.*

## CYLINDER HEAD REPAIR

Have you tried to buy an aluminum cylinder head recently? Then what are you going to do when you have a head which has corroded around one of the water holes so that water leaks into the combustion chamber?

Here's what I do: Cut away the oxidized metal around the hole until you get a clean, hard surface. Then tap it for whatever size is necessary (usually about 1/2 inch) and screw in a pipe fitting. Cut the fitting off flush with the surface of the head. In this way you block off the water from reaching the combustion chamber, and the head is suitable for further service.—*A. W. Lummis, 1805 Ponce de Leon Blvd., Coral Gables, Fla.*



# DOCTOR OF MOTORS

• His Study Never Ends



EVERY minute of the day this "Doctor of Motors" exhibits the versatility that comes from never-ending study. Mechanic, motor analyst, electrician, machinist, welder, metalworker — he is all these and more.

He is a man of many talents. Your automobile mechanic studies continually with enthusiasm because repairing automobiles is not only his profession—it is also his hobby. Practical experience and constant study keep him up

to date and tell him exactly how to fix your car when it needs it.

Better mechanics everywhere recommend and install Perfect Circle Piston Rings because they know how well these rings stop oil pumping, save gasoline, and restore power, pickup, and pep.

Install Perfect Circles in your car. It will take but a few hours and the cost is surprisingly low.

THE PERFECT CIRCLE COMPANIES, Hagerstown, Ind., U. S. A. and Toronto, Ontario, Can.



HE'S AN ELECTRICIAN

**PERFECT  
CIRCLE**  
PISTON RINGS

## Going to Bat for You . . .

Folks have a habit of listening to an outsider's viewpoint. When someone other than yourself goes to bat for you, they are duly impressed.

Now, Perfect Circle is doing just that! In the March 14 issue of *The Saturday Evening Post*, for example, appeared another in our current series of messages in praise of your versatility, ability, and honesty. Look for it in *Life*, *Collier's*, and *The Country Gentleman*, too.

This is our way of telling the owners of 34,000,000 vehicles that you know *your* business and deserve *their* business.

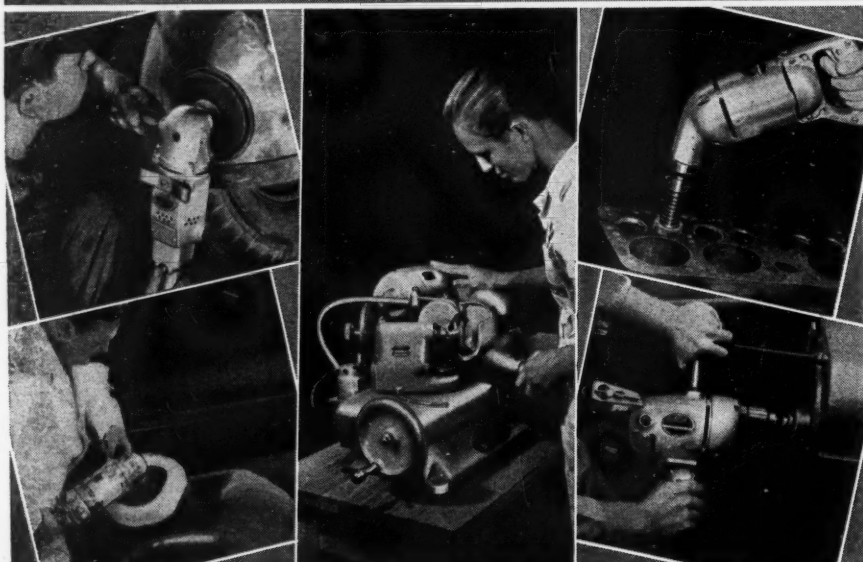
**PERFECT  
CIRCLE**  
PISTON RINGS

THE PERFECT CIRCLE COMPANIES • Hagerstown, Indiana, U. S. A. and Toronto, Ontario, Canada

Canon Auto Parts, of Canonsburg, Pa., expresses its belief in the future of the automotive business by opening a new, modern parts room. Personnel shown, left to right, G. M. Gallagher, Dale Schussler, Edward Cover and Max Griffith.



## Now's The Time to Really Put



## Your VAN DORN Tools to Work!

WITH good mechanics hard to get, you can be glad you bought Van Dorn Tools. For your present Van Dorn Tools will speed up thousands of jobs around your shop—will help you do better work, more of it, at a better profit. And, remember, your Van Dorn Tools have the "stuff" to last you for the duration with proper care. Ask your jobber for a Free copy of the Van Dorn Handbook—

"Proper Care and Maintenance of Portable Electric Tools." It will give you many helpful hints on how to make your tools last longer, serve you better. Also it lists Van Dorn's 26 Factory-owned service branches, from which you can get quick repair service and genuine factory parts, if and when you need them. The Van Dorn Electric Tool Co., 727 Joppa Road, Towson, Maryland.

**"Van Dorn"**  
(DIV. OF BLACK & DECKER MFG. CO.)  
**PORTABLE ELECTRIC TOOLS**

## DETROIT LETTER

(Continued from Page 78)

when automobile production is resumed. Such dealers may purchase from Chevrolet, Cadillac, Oldsmobile, Buick and Pontiac the same annual percentage of the resumed production as they did during the 1941 model year. They also will receive a bonus of 40 per cent of their percentage, subject to availability of cars. This system will prevail for two years after production is resumed. Former GM dealers also will have priority of reappointment when franchises are open if their former contracts were terminated under mutually satisfactory conditions.

General Motors also has agreed to repurchase from its dealers those new and unused 1942 model passenger cars which they have in stock after April 1. The dealers will receive the dealer's net cost, including transportation charges, plus an additional amount equal to 1 per cent of the list price or \$15, whichever is lower, for each calendar month or major part thereof which the car has been held since Jan. 31. Any new and unused 1942 model accessories will be repurchased up to July 1 at the dealer's net cost, while genuine repair parts for 1939 models or later will also be repurchased. This plan is designed to relieve dealers of unbalanced inventories and help those who want to liquidate.

### New Anti-Freeze

A new anti-freeze which is said to contain no salts or other harmful ingredients has been placed on the market by the Great Northern Chemical Co., 1033 South Blvd., Oak Park, Ill. The manufacturer states that "No-Freeze" anti-freeze can be drained out of the car and stored for next winter's use without losing its strength. One filling lasts all winter, and affords protection to 35 deg. below zero. "No-Freeze" anti-freeze is said to prevent rust and corrosion, to be free from toxic fumes and sludge, and to be harmless to metal parts of the cooling system or to the car finish.

"WINGS OVER THE  
SPANISH MAIN"

Pan American "Clippers"  
trace new trade routes  
in the Caribbean



## AROUND THE WORLD...and around the town!

On routes that practically circle the globe, Pan American "Clippers" have used Wolf's Head Oil for over 13 years—for more than 900 million passenger-miles.

These days, when quality in motor oil is such a vital consideration, this long-range aviation experience becomes an invaluable guide to service men. When you fill a customer's crankcase with Wolf's Head, you know you're providing the *safe protection* so essential to engine conservation and trouble-free performance. Wolf's Head Oil Refining Co., Oil City, Pa., New York, N. Y.

*Be ahead with* **WOLF'S HEAD**

**MOTOR OIL and LUBES**

100% Pennsylvania P.C.C.O.A. Permit No. 19



**35¢**

A QUART



## CUTTING PATTERN TO FIT

(Continued from Page 26)

certainly not one of conservation. In the majority of cases, we wanted cars to perform, with maximum pep and smoothness, not with maximum economy. Every driver knows that an improperly adjusted carburetor, a faulty ignition system, or improperly aligned wheels are the fifth columnists of a motoring America, but are we aware of the possibility of a far more subtle waste in indiscriminate selling and buying in sets and ensembles.

Any woman knows that hat, bag, shoes, and gloves all of blue will look better with a gray coat than would brown shoes, a black purse, blue hat and black silk gloves, yet, maybe for the next few years we'll be lucky to have bags, and shoes, and hats of any color. Our own insistence on a blue purse and shoes might mean someone else's going without. That's not democratic. That's not American! That's not for us!

For an example of ensemble selling in the automotive line, let's look at the case of a four-year-old car which might have come into your shop any time last year with a defective wire. Because the car was four years old, it was reasonable to assume that wear on all parts (and therefore on all wires) was more or less even, and so, to save the customer time and inconvenience, you would probably have sold him a whole new wiring job.

In times of plenty there is much to be said in favor of such a policy. Today, however, one set of wires may be all that's needed to keep a half dozen cars on the road, so does it seem right, wise, or even fair to your own business or to your other customers to put the whole set on a car that may need only one or two wires and force five other cars off the road . . . and out of your shop?

It is all part of our philosophy and striving for top-notch rather than economical performance. Perhaps top-notch performance is one of the things we're going to have to do without "for the duration."

Last year one broken valve spring in an engine might have been taken as a warning that all the valve springs should be replaced. This year the wise mechanic knows that when one goes, several others may wear out in the near future, but he also knows there may be two or three which will be good for a long while yet. The two or three he may be able to save on this car will result, after three or four such jobs, in his having a whole extra set, and will enable him to keep that many more cars on the road that much longer.

Ensemble buying is not deliberate hoarding, for usually it is done in complete unawareness of its full effect. In any set-up such as we face today, however, it can be waste if undue emphasis is placed upon it.

Any woman who used her whole week's rationed supply of butter and sugar so she could give her family all the cakes and candy and sweet things they wanted on Sunday, and then made them go hungry all the rest of the week, would be judged dangerously incompetent. Yet is there much difference between that and selling a man with just one faulty spark plug a complete new set, thereby forcing several other motorists to stop using their cars because there are none left for them?

We do not say that complete replacement isn't the wisest thing under peace-time conditions. We don't pretend that partial replacement will give top-notch performance in all cases—or even in most cases. But, like our pioneer ancestors who adopted straighter and shorter skirts (when they knew that voluminous hoop skirts were prettier and more becoming), the automobile industry has got to learn to cut its merchandising pattern to fit its limited supply of materials!

**PRODUCTION FOR VICTORY**  
 . . . Kellogg has accepted its responsibility to a fighting America. Currently in production are compressors and special parts and assemblies for the Army, Navy and Air Corps.

**A KELLOGG-AMERICAN CERTIFICATION means Profitable Operation for You . . .** All Kellogg-American equipment must survive thorough testing — a merciless workout, far harder than any service you can give it. Kellogg takes the grief, you get long service, low upkeep and power cost, *the most you can get for your money in shop equipment.*

**Kellogg-American**  
 AMERICAN BRAKE SHOE & FOUNDRY CO.  
 KELLOGG DIVISION  
 ROCHESTER NEW YORK U.S.A.

**AIR COMPRESSORS • CAR LIFTS • CAR WASHERS • PAINT SPRAY EQUIPMENT**

**F**acing the unknown problems of reconditioning a strange engine is no mystery when you rely on the correct Pedrick Engineered Set of piston rings.

**Your confidence is justified,** first, by the unexcelled flexibility of Pedrick expander-type rings, which assure immediate oil control even in badly worn cylinders and which continue to hug the wall closely for dozens of thousands of miles, preventing blow-by, maintaining compression, and saving fuel.

**Even greater assurance** is justified by Pedrick's 21 years of designing, producing, selecting, and combining special sizes and types of rings to meet the individual peculiarities of the engine for which they are specified—a longer specialization in true *engineering* of Sets than any other manufacturer can offer.

**Your final justification** for selecting a Pedrick Engineered Set is the most liberal labor and ring guarantee which accompanies it—complete protection of your working time, your cash profit, and your shop reputation.

## PISTON RINGS

WILKENING MANUFACTURING COMPANY,  
PHILADELPHIA. In Canada: Wilkening Manufacturing Company (Canada) Ltd., Toronto.

## HE, TOO, HELPS WIN THE WAR

(Continued from Page 19)

causing the car and its tires to wear out more quickly.

And it is absolutely essential to keep munitions workers' cars in operation as long as possible. The reason for this is that there are insufficient trolleys, buses and trains to carry them to work. Every passenger car that is driven from the road because of the lack of a tire or other part increases the load on the public conveyances, which are already operating at close to capacity. In every metropolitan area, old buses and trolleys which had been discarded as obsolete are being called back into service. In addition, new units are being ordered, but delivery is slow because of the scarcity of materials and because such manufacturers are also busily engaged in direct war work.

For instance, the city of Detroit, which operates 1797 buses, is getting 99 additional buses during 1942 and is about to place an order for 500 more to carry the increased load resulting from the step-up of war production. However, the city officials are not too sanguine about getting the 500 additional units. In addition to buses, Detroit operates 910 street cars and it is understood that 106 should be discarded as being obsolete, but instead are being reconditioned for further service.

A survey of Michigan plants indicates that of 749 plants analyzed, employing 434,684 persons, 326,649 or 75 per cent go to work daily in their own cars. Obviously, no transportation system is equipped to take care of such an overload.

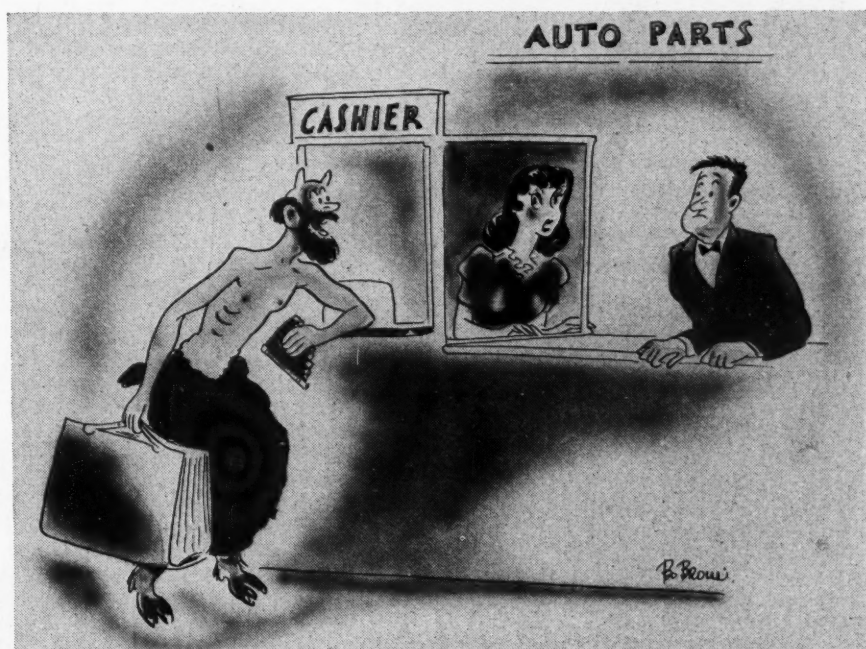
The Greyhound Lines operating 97 buses to Mt. Clemens, Birmingham, Pontiac, Wyandotte and Trenton, are reputed as operating at full capacity as are the Flint Trolley Coach Co., the Lake Shore Lines, the Dearborn Motor Coach Line and many others. Reports from many metropolitan areas indicate that passenger travel in common carriers has increased from 15 to 30 per cent.

Just how many more passengers the so-called common carrier can take care of is, therefore, problematical. And, with the increase in war workers, the curtailment of tires to civilians, and the location of many munitions plants far from metropolitan centers, the problem is becoming extremely critical.

As further evidence of the importance of the civilian passenger car in the transportation system, let us consider the problem as presented by various munition makers.

The Baldwin Locomotive Works would seem to be in a highly favorable position from a transportation point of view, situated as it is on the Pennsylvania Railroad, also close to the Reading and B & O railroads, and several bus and trolley lines. But 90 per cent of the employees arrive in passenger cars. One reason why more do not use the railroads is that the majority of the workers live west of the plant, from which direction there are inadequate transportation facilities. Between 1500 to 2000 cars are parked on company grounds during the day shift. Officials of the indus-

(Continued on Page 92)



"It's that jobber salesman from the Smithers Co. to see us about our spring tune-up line!"



# EVER SINCE POLAND . . .

Ever since the first bomb dropped, COLLIER'S has been blasting out complacency and waking up people to the service needs of their automobiles.

Each succeeding year, more dealers, jobbers and manufacturers saw the handwriting on the wall and buckled down to make COLLIER'S P. S. the backbone of their service programs.

But today, there are still some "leaning on their tools and staring into space."

Wake up, you men in the automotive industry! There is more work to be done than people to do it!

Every automobile must be put in the "pink"—and kept that way. Thirty million cars represent billions of dollars' worth of transportation facilities. The nation needs it in good running order NOW!

Don't pull your punches when you're selling service today. You can point to COLLIER'S P. S. for your authority, and press for action. Not one service man . . . Not one jobber . . . Not one manufacturer can fall asleep on this job. Preach . . . PREACH . . . P-R-E-A-C-H conservation; Sell . . . SELL . . . S-E-L-L service—as a means to this end.

**WARNING ABOUT REPRINTS.** Get your order in now for reprints of the June P. S. spread. We are still holding the cost down to \$2 per 100. Minimum order \$3. Payment must accompany order. All shipments made by express **CHARGES COLLECT.** Address **PREVENTIVE SERVICE, COLLIER'S, 250 Park Avenue, New York City**

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**EVERYBODY'S TELLING YOU**

Your Lubrication and Service Sales Must Increase During 1942

**WE'LL HELP YOU DO IT!**

# Find the Big Sale Behind Small Troubles!

Getting Down to the Real Trouble means More Satisfied Customers and More Business for You!

**M**ANY PROFITS—many customers—are lost by not selling a motorist all he needs.

New light bulbs, for instance, mean a trivial profit . . . but finding the cause of the trouble may mean a big profit and a more satisfied customer, too! For the lights stay fixed!

Socony-Vacuum is ready to help teach your men how to "follow through" on trivial jobs—how to show customers the need for additional service. It's part of "Modern Service Methods" . . . a valuable program of help for car dealers!

#### FACTS ON "MODERN SERVICE" METHODS

- **Unique Training Course**—Everyone in your organization trained in Modern Service Methods by Socony-Vacuum specialists.
- **Your Market is Surveyed**—to calculate the future growth of your business.
- **Your Present Layout is Studied**—Improvements in equipment and arrangement suggested.
- **Sales Promotion**—We offer promotion pieces to push your specials . . . to bring in new customers.

SOCONY-VACUUM OIL CO., Inc., and Affiliates—  
Magnolia Petroleum Co., General Petroleum Corp. of Cal.



WRITE TO CAR DEALER DIVISION—SOCONY-VACUUM OIL CO., INC., 26 BROADWAY, N. Y. C., FOR FACTS ON

## SOCONY-VACUUM'S

**MODERN SERVICE METHODS**



## HE, TOO, HELPS

(Continued from Page 87)

trial relations department are authority for the statement that the plant would be paralyzed if the workers were deprived of their cars.

At the E. G. Budd plant in Philadelphia, 55 per cent of the employees use automobiles in getting to and from work, and inquiries at the company office bring out the fact that many employees travel great distances, some coming from suburban and rural communities 10, 20, and even 30 miles

from the city. Many of the workers are small farmers, working their farms by day and doing a night shift at the Budd plant in addition. A company spokesman stated that taking the cars from the men would be a serious blow, and that a worker could not be expected to work the long hours at the plant and put in the extra hours that would be necessary if he traveled by bus or trolley.

At Bendix Aviation at Wissahickon (Philadelphia) the same general picture holds true. The plant now employs in excess of 5000 men and more than 1000 cars are parked daily on company-owned lots and overflow

parking on the street extends for blocks in every direction. Company personnel officials state that cars are always filled to capacity.

These three plants are all in the Philadelphia area, serviced by the Philadelphia Transportation Co. The company points out on the run to the League Island Navy Yard, 46 per cent more vehicles have been found necessary to handle the increased number of workers.

As the result of purchasing 683 new trolley cars and buses and the rehabilitation of old units, the company thinks it can handle the increase in car riders this year. But this assumption is based on the continued use of the private automobile.

These few examples are typical of metropolitan areas. Transportation conditions at munition plants in rural and isolated areas are even more difficult, as there are seldom any commercial transportation facilities available.

The situation at the Martin Plant outside of Baltimore may be cited as an example of a rural manufacturer. Here 28,000 workers out of a total of 30,000 go to work each day by automobile. There is no adequate facility for transporting them when their cars wear out.

From the foregoing, it is obvious that the private passenger car is an extremely important link in the transportation system of the United States and, without it, the war effort would be in danger of failure. The extreme importance of the passenger car is brought out by some data released by the Automobile Manufacturers Association which points out that 79 per cent of necessity travel is done in privately owned passenger cars.

The necessity of keeping the passenger cars rolling should, therefore, be obvious and these facts should be explained to the car owner in order to have him take the best of care of his car, driving slowly in order to conserve tires, fuel and oil, and also bringing it to a repair shop frequently for general checking and maintenance.

In connection with tires, the situation is not nearly as bad as many people believe. This is indicated by the results of a Gallop poll which indicated that 30 per cent of the cars were fitted with tires which would last for two or more years, and only 23 per cent of the cars would wear their tires out in less than six months. Those percentages indicate that many millions of cars will continue to roll and they will do so with the help of America's servicemen.

An additional optimistic note on the tire situation is the recent governmental order permitting a certain amount of retreading for salesmen and farmers.

Looking at the automotive service picture as a whole, the MOTOR AGE reader is really in an excellent position. For, while passenger car travel will decrease in volume, and tire and

(Continued on Page 97)

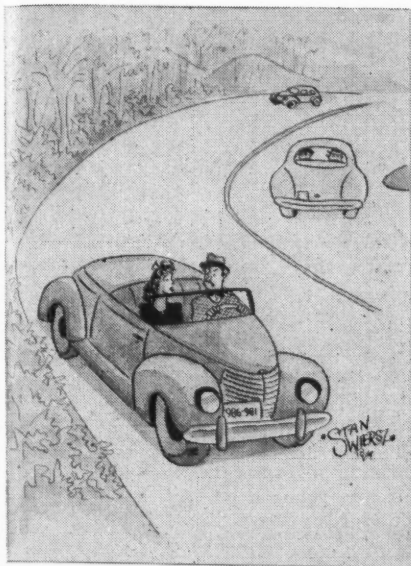


*Symbol of Quality*

**IN LUBRICATING EQUIPMENT**

Efficient design, sturdy construction and honest manufacture have long made ARO Lubricating Equipment the choice of those smart buyers who compare real values before making buying decisions. These same smart buyers are now — more than ever — appreciating ARO's outstanding performance and economical operation, and the extra long life of dependable service built into every ARO Lubricator. As an ARO user you will appreciate ARO's nationwide maintenance service. Whether your ARO unit needs merely a new set of hi-draulic coupler jaws — or a well-earned "complete overhaul" — consult your ARO Jobber.

THE ARO EQUIPMENT CORPORATION  
Bryan, Ohio, U.S.A.



"Alright, if you're so smart I'll go back to George—he's got four new tires on his car."

## HE, TOO, HELPS

(Continued from Page 92)

gasoline sales are restricted, truck, tractor and industrial-engine work is on the increase. Furthermore, as filling stations and tire shops find it more difficult to operate because of reduced volume, the business done normally by such establishments will come to the shop operated by MOTOR AGE readers, who are prepared and equipped to do a complete job of servicing from the smallest tire repair and the selling of gasoline to the tuning and complete overhauling of the entire automobile.

## Thermoid Offering New Brake Service Book

More than 25,000 copies of the new and greatly enlarged Brake Service Reference Book published by Thermoid Co., Trenton, N. J., have already been distributed to dealers and brake-service men attending showings of the new Thermoid talking movie on brakes "Keep 'Em Holding." This practical, instructive film is now being featured in dealer meetings sponsored by Thermoid distributors all over the country.

In making this Reference Book available at these meetings, Thermoid makes it possible for brake mechanics to put into actual shop practice the valuable information on hydraulic brake operation and approved service and adjustment methods featured in "Keep 'Em Holding."

Thermoid's Brake Service Reference Book contains up-to-date instructions on all popular brakes including the Wagner Hi-Tork Brake, the Bendix Hydraulic double anchor, and the new Bendix Hydraulic without the eccentric on secondary shoe.

In addition, the Brake Service Reference Book contains an extended section on fast, effective "trouble-shooting" methods, illustrated by actual case histories drawn from the experiences of Thermoid's engineering and field men all over the country.

## Welding in Movies

Six one-reel, all-color sound motion pictures, designed to help speed war efforts through the faster and better training of welding operators, are now under way for the General Electric Co., according to an announcement by C. I. MacGuffie, manager of G-E arc

welding sales. Titled "The Inside of Arc Welding," the films are being produced by the Raphael G. Wolff Studios, Hollywood, who have evolved a new technique for picturing this difficult subject in a dramatized and highly interesting manner.

When completed the pictures will be made available to public, private, and industrial welding schools, as well as to other interested groups. The first of the pictures covers the fundamentals of arc welding. It is scheduled for general release about April 20. The other pictures will be available about June 1.

## "Long-Life Peak Performance"

*Today—  
our slogan  
carries a  
vital message*



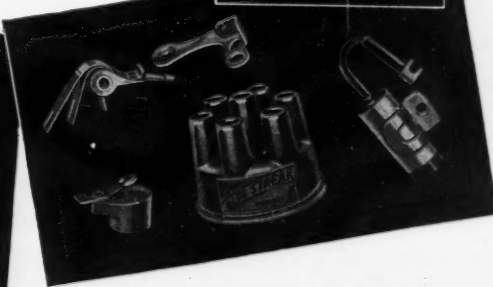
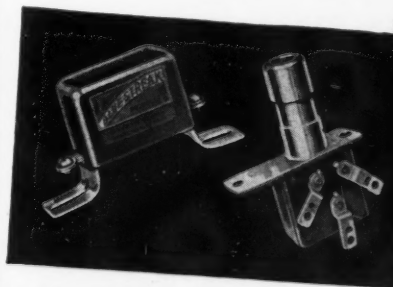
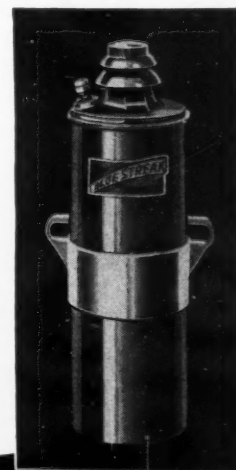
THE materials that go into ignition parts are practically all listed as "Strategic." For that reason alone it is sound judgment, when making replacements, to use parts that give the longest service.

The answer is "Blue Streak," the ignition parts line that offers time-defying resistance to wear. The line that gives the commercial car owner assurance of uninterrupted ignition service, continued far beyond ordinary limits.

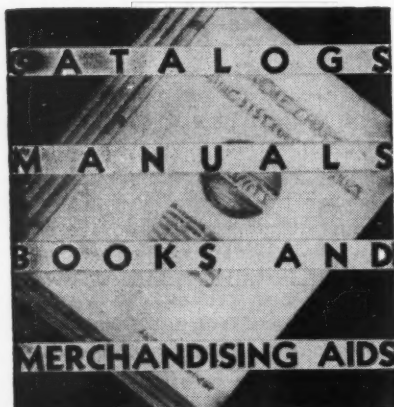
Yes—Today our slogan—"Long-life Peak Performance"—carries a vital message.

**STANDARD MOTOR PRODUCTS, INC.**

37-32 Northern Blvd., Long Island City, N. Y.



**"The ABILITY to serve well is as important as the WILL to do so."**



The Chek-Chart Corp., 624 S. Michigan Avenue, Chicago, Ill., has released its new 1942 model Lubrication Wall Chart. In addition to lubricant recommendations, the capacities of the crankcase, transmission, differential, cooling system and gas tanks are given. Car models included in the chart go back to 1938. Trucks and tractors are included.

\* \* \*

The Electric Auto-Lite Co., Toledo, Ohio, has issued a handy, pocket-size spark-plug specification catalog. It contains information on plug replace-

ments for almost every make and type of internal combustion engine, including automobiles, trucks, tractors, marine and stationary engines. The catalog has a hole punched in the upper left-hand corner so that it can be hung up to be ready for instant reference.

\* \* \*

Gatke Corp., 228 N. LaSalle St., Chicago, Ill., has a new catalog covering its line of Gatke Blue Ribbon Grooved Dura-Blok brake-lining sets and Dura-Blok wire-back brake-lining in rolls. Products are arranged with a simplified alphabetical listing by make, year and model of car, and the catalog includes illustrated brake adjusting charts. Copy will be sent upon request.

\* \* \*

The Plomb Tool Co., 2209 Santa Fe Ave., Los Angeles, Cal., announces publication of its 1942 catalog containing listings of over 1200 kinds of fine forged hand tools. The catalog is lithographed in three colors, contains 116 pages, and features large and detailed illustrations, showing tool boxes and kits, sockets and attachments, wrenches, screwdrivers, pliers and all miscellaneous types of mechanics' hand tools. Copy of this new catalog will be sent upon request.

\* \* \*

K-D Mfg. Co., Lancaster, Pa., announces Catalog No. 21, covering its line of special and general service tools. Write for free copy.

\* \* \*

L. F. Kregor Mfg. Co., 550 West 35th St., Chicago, Ill., has a new catalog covering its line of replacement parts, and including speedometer cables and fuel pump rebuild kits, repair kits and parts. Write for your copy.

\* \* \*

The Blackhawk Mfg. Co., Milwaukee, Wis., has issued a new pamphlet known as the "Handy Guide," listing its complete line of wrenches and wrench sets. It describes the socket, box-type, open end and torque-indicating wrenches, as well as the recent "Huggets" line which is furnished with 7/16 in. drive. A copy of this pamphlet will be sent free upon request.

\* \* \*

To stimulate business for its Stromberg carburetor dealers, Bendix Products Division of Bendix Aviation Corp., South Bend, Ind., has developed a series of six new mailing cards. Each card is printed in four colors, and the subject matter deals with the tie-in on the national program to conserve gasoline, as well as containing seasonal messages. Space is provided for dealer's imprint.

## HELP YOUR CUSTOMERS WITH THEIR *Tire Problems*

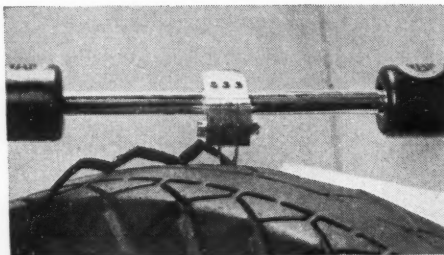
This is your BIG OPPORTUNITY, not only to be of real service to your patrons when they bring you their tire troubles, but to also make a nice profit. The driving public is extremely safe tire conscious. Under the present set up the only out for most car owners is regrooving. Don't disappoint them; prepare now so that you will be in position to help them.

## THE *Van* TIRE REGROOVER

the regroover that is used by Goodrich, Goodyear, Firestone, Lee, Seiberling and many large fleets should need no further recommendation to you.

### Important Points of Superiority:

- 1—Clear vision at all times
- 2—An unlimited number of different combinations of cuts by a simple adjustment
- 3—Scientifically designed blades cut various depths and cut straight without effort
- 4—Light in weight—you can regroove 100 tires a day
- 5—One year guarantee
- 6—32-page Instruction Book with over 40 diagrams giving complete operating instructions and short cuts



UNIVERSAL MODEL

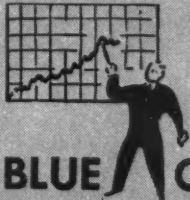
Complete with Instruction Book, 1 dozen assorted blades, and 1 file for sharpening blades .....

**\$21.85**

Add the Van Tire Regroover service to your other services TODAY. Bring your shop up to date. If your Jobber can't help you—write us.

**VAN TIRE TOOLS, INC.**  
135 North 22nd Street, Philadelphia, Pa.

# AIR COOLED



## BLUE CROWN sales up 94%

There are many important reasons for the tremendous increase in BLUE CROWN sales. Foremost is BLUE CROWN dependability under fire. The tougher the going the more unmistakably BLUE CROWNS rise to the occasion. \*Air Cooled Finned Shells, \*Porenite Insulation, \*Precise Engineering and Testing, \*2-piece Construction and Plano-Radial Seating for Permanent Gas-Tightness . . . These are some of the features that insure BLUE CROWN efficiency, long life and dependability.

**MOTOR MASTER PRODUCTS CORP.**  
4757 NORTH RAVENSWOOD AVENUE, CHICAGO, ILLINOIS



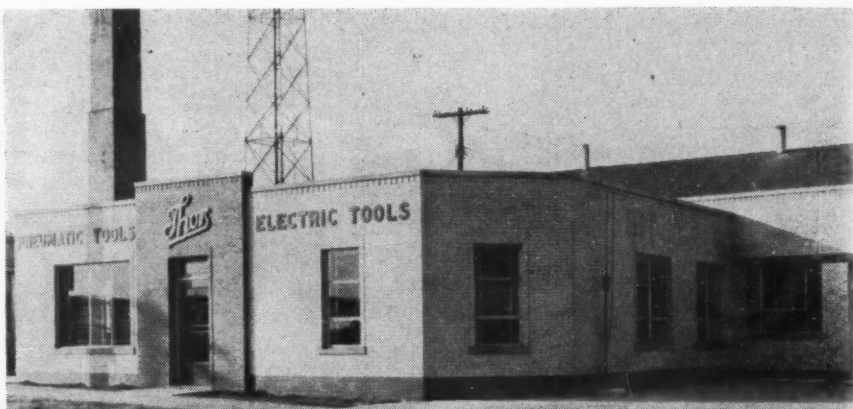
# BLUE CROWN

*Exclusive* **EXPORT  
DISTRIBUTOR**

*Air Cooled*  
**SPARK PLUGS**

**BORG WARNER INTERNATIONAL CORPORATION**  
310 S. Michigan Ave. Cable Address, BORINTCO Chicago, Ill.

Recently completed branch sales office and service station of the Independent Pneumatic Tool Co., makers of Thor pneumatic and electric tools, at 15605 Wood Wilson Ave., Detroit, Mich. Other modern service buildings were completed recently at Philadelphia, Pa., St. Louis, Mo., and San Francisco, Cal.



## DEFENSE BULLETIN



### WE ARE ALL ON THE FIRING LINE . . . — NOW!

This war will be won by the "all out" teamwork of the men who fight and the men who work. Every product we produce for National defense has a direct bearing on victory. It may be hose for a navy yard on the Pacific, or rubber parts for a Detroit sub-contractor working on tanks, or airplane orders from Buffalo.

Continental customers well understand that their "civilian" needs must take second place to their war demands. Thus those who work, and those who wait, are also on "the firing line" in this fight which must not fail for the freedom of us all.

From Factory Bulletin Board of the

# CONTINENTAL RUBBER WORKS

MAKERS OF THE VITALIC LINE SINCE 1903

ERIE, PA., U.S.A.



### J. H. Williams & Co. Elects

At a meeting held in New York City on Feb. 26, the board of directors of J. H. Williams & Co., filled the vacancy caused by the recent death of J. Harvey Williams, the late president, and elected the following officers:

A. Donnally Armitage, president; E. J. Wilcox, vice president in charge of stock product sales; Willard C. Kress, vice president in charge of all manufacturing. Re-elected were Hugh Aikman, secretary, and Clark M. Fleming, treasurer. Fleming was, in addition, elected a director to fill the vacancy arising from Mr. Williams' demise.

Armitage, former vice president of the company, will continue to make his headquarters in Buffalo where the plant is on three-shift production of drop-forgings, wrenches and other drop-forged tools for military and civilian use.

Wilcox, formerly sales manager of the stock products division, will continue at the company's general sales office, 225 Lafayette Street, New York.

### Young Radiator Names

#### War Production Group

In answer to the March 2 radio appeal of Donald Nelson, War Production Board chairman, for greatly increased production of war materials, Young Radiator Co. of Racine, Wis., has announced the appointment of a company War Production Coordinating Board to be headed by L. C. Pfost, plant superintendent, and Blendon DeMint, president of Young Local No. 37 CIO, UAW. Two additional Board members will be selected—one from the ranks of the plant workers, the other from the office force.

The functions of the Board, according to Fred M. Young, president of the company, will be to study production incentive plans in operation elsewhere, to institute a program to acquaint all employees with the company's war production goals, and to cooperate with military and government officials responsible for speeding up the nation's production output.

# YOU GET "EXTRA HELP" WHEN GREY-ROCK CHECKS IN!



For the shop that can't turn out all the brake jobs that come in—Grey-Rock has the answer! It's Grey-Rock's 3-POINT PLAN designed to save minutes and multiply them into extra hours to handle extra jobs. Even new help is *fast* and sure with Grey-Rock! More than ever, today's slogan for profit is: "Careful work with no comebacks." Let your Grey-Rock jobber show you how this plan gives you this "extra help." UNITED STATES ASBESTOS DIVISION of Raybestos-Manhattan, Inc., MANHEIM, PA.

## THIS 3-POINT PLAN OF GREY-ROCK'S GIVES IT TO YOU:



**NATIONAL SAFETY COUNCIL STANDARDS**—quickest, surest, safest check on brake inspection, adjustment and retine jobs.



**GREY-ROCK ENGINEERING METHODS**—the expert way to do good brake jobs faster and better. Every brake is diagrammed in the big Grey-Rock service guide.



**GREY-ROCK BALANCED BRAKSETS** and Truck and Bus Blocks are the correct nationally-advertised linings worthy of good service. Famous Vee-Lok Clutch Facings are best for every vehicle.

NOW... MORE THAN EVER...  
DEPEND ON

# Grey-Rock

**BALANCED BRAKSETS**  
BRAKE BLOCKS • CLUTCH FACINGS • FAN BELTS • ROSS

## Pedrick Enlarges Line of Engineered Sets

In its new 1942 price catalog, the Wilkening Mfg. Co., Philadelphia, Pa., lists a great many new Engineered Sets of Pedrick piston rings. Most important are the 25 new Engineered Sets primarily for use in farm tractors, and the new sets for heavy-duty trucks and bus engines.

There are Engineered Sets for such tractors as McCormick-Deering, John Deere, Caterpillar, Allis-Chalmers, Cletrac, Oliver, Fordson, Case and Rumely.

Among 140 sets primarily for truck and bus engines are many for Auto-car, Cummins Diesel, GMC, Hall-Scott, Hercules, IHC, Mack, Wauwasha and White. One of the sets engineered for Diesel engines is E273 for GMC 71 engine, containing special grooved and tinned compression rings and Pedrick Hydraulic oil rings similar to GMC original equipment.

The manufacturer claims that in each of these Engineered Sets has been accomplished the difficult job of combining in one piston ring installation all the features which are so necessary for all-around performance—oil control, blowby control, full

power, gas economy, top-cylinder lubrication, minimum wear, long engine life.

A copy of the 12-page price catalog listing all 235 of Pedrick Engineered Sets will be sent to any interested person on request to the manufacturer.

## Mercury Offers Combination Tester

The Mercury Corp., 221 West 18th St., Kansas City, Mo., has announced a new electrical instrument which can be used either as a fast battery charger or as an electrical test unit for starter, generator, wiring system, voltage regulator, etc. As a battery charger, it is equipped for individual cell testing, complete battery analyzing, and incorporates a desulphater unit. The new unit, identified as the New N-100, is 33 in. high, 20 in. wide and 16 in. deep, and is equipped with two rubber-tired wheels and has two handles at the top so it can be moved around like a hand truck. List price is \$219.75 east of the Rockies.

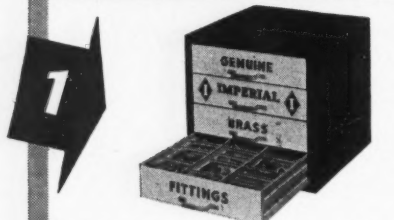


## Raybestos Offers New Equipment

The Raybestos Division, Raybestos-Manhattan, Inc., Bridgeport, Conn., has introduced two new items of equipment for the brake department. For the smaller shops it offers an attractive display cabinet designed for special combination assortments of Raybestos PG Sets and Wire Molded Lining. The body of the cabinet stocks and displays PG Sets, while the top and bottom are provided with storage spaces for wire molded lining in sets and rolls.

For the shop which wishes to set up a brake department, Raybestos offers a background piece attractively covered with leather finish to set off the department and merchandise the service. This background is available alone, or with equipment and a stock of brake lining.

## Some Suggestions For Building Up YOUR SERVICE WORK



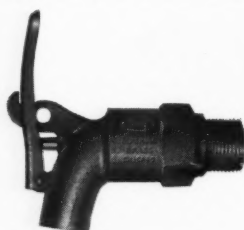
1 ● Install a cabinet stock (free cabinet) of Imperial fittings and increase your volume of tubing connection work.



4 ● Get a supply of Imperial Bundy tinned steel tubing and use it in place of copper tubing.



2 ● Get one of these Imperial Flexible Fuel Line Merchandisers and build a profitable volume of flexible fuel line replacements.



5 ● Install Sette Faucets on all of your oil drums and get set for rapid handling of your oil business.



3 ● Equip yourself with these two Imperial tools and speed up your tubing connection work.



No. 127-F Tube Cutter



6 ● Order an Imperial Shatterproof Battery Hydrometer and go after more battery charging and repair business.

Your Imperial Jobber can give you detailed information on these and other Imperial products. Or write for Catalog No. 122.  
IMPERIAL BRASS MFG. CO.  
1217 W. Harrison St., Chicago

## IMPERIAL Automotive Products

## OUR INDUSTRY AT WAR

Rationing of all types of new trucks, truck tractors, and trailers became effective March 9. Preference will be given police, fire-fighting, and other public-health services and users engaged in the war program. Ordinary civilian users are classed at the bottom of the list.

Civilian applicants must use form PD-310 in applying for permission to purchase a truck and must show:

1. They cannot meet their needs by leasing equipment.
2. They cannot fill their needs by pooling their present equipment with that of other operators.
3. They cannot transfer vehicles now being used for less essential purposes to the use for which they desire new vehicles.
4. They cannot possibly repair the vehicles which they desire to replace.

Application must be filed with the local allocation office of the Office of Defense Transportation. If approved by the local office, the application is forwarded to the Washington office for review, and, thence, if approved a second time, to the WPB for issuance of a certificate of transfer, known as PD-321.

If the local office turns down the application, the applicant may appeal to the local appeal board. These boards have been established at each local allocation office.

All necessary forms and instructions may be obtained at any sales agency handling the make of vehicle desired.

\* \* \*

Anyone having machine tools standing idle in his shop is urged by George C. Brainard, chief of the Tools Branch, WPB, to list them for sale with the WPB, so the tools may be located by firms needing them for war production. Information regarding the tools should be sent to the Available Tools Section, Tools Branch, War Production Board, Social Security Bldg., Washington, D. C.

"To make the records uniform, sheets 8½ by 11 in. should be used," the instructions state, "listing one machine on each sheet. A copy of each listing should be retained until such machine is sold, then the owner's copy should be forwarded to the Available Used Machine Tools Section, with 'Sold' marked across its face.

"In listing available machines for sale, give make, type, size and description, including age and serial number. State whether the drive is cone or geared head, and give the machine's condition (excellent, good, fair, or broken). Any extra or missing parts should be noted. The present location of the tool should be listed with the name of the owner, the asking price, the name and telephone number of the person to contact for purchase. A photograph or

cut of the machine will be very helpful."

\* \* \*

Manufacture of medium trucks has been forbidden by the WPB after February quotas have been completed, the March quotas for such trucks having been cancelled. It will be permissible to build trucks having a gross vehicle weight of 16,000 tons or more, but no truck can be built unless it can be produced from semi-fabricated or fabricated materials which the

manufacturer had on hand on Feb. 28.

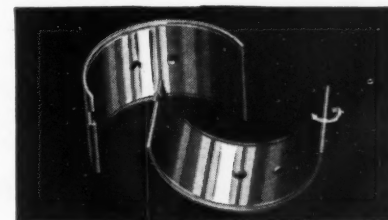
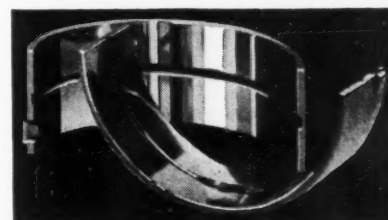
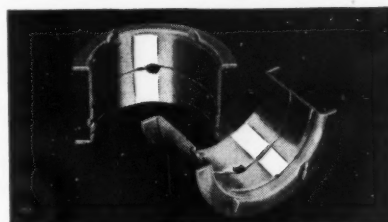
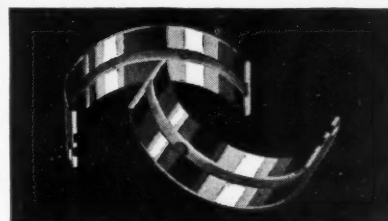
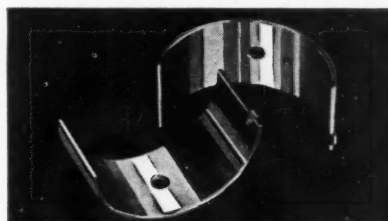
Revision of the maximum price schedule for 1942 passenger cars now permit the dealer to deduct the wholesale price of standard equipment from the maximum retail price of the car when the equipment was removed at the factory. Formerly, he was required to deduct the retail price of the equipment so removed. If no allowance was made the dealer by the factory, he is not required to reduce the retail price of the car. But, if the dealer himself removes the

(Continued on Page 110)

## JOHNSON *Slip-in* BEARINGS

The extra service now imposed on all cars and trucks means plenty of overhaul jobs. This calls for complete sets of *quality* bearings. You can make the most of this opportunity with Johnson Slip-in Bearings.

Johnson replacement parts are easy to install. Correct in every detail—precision fit, design, alloy—they slip right into place with a minimum of effort. Once installed, they will equal or surpass the performance of original equipment. Why not play safe .. specify ... JOHNSON BRONZE on your next order. Write for complete catalog.



### JOHNSON BRONZE

*Sleeve* BEARING HEADQUARTERS

455 S. MILL STREET • NEW CASTLE, PA.

## OUR INDUSTRY AT WAR

(Continued from Page 109)

equipment, he must deduct 75 per cent of the price he would have realized from the equipment if he had sold it separately as of Oct. 15, 1941. Manufacturers are now required to reduce the wholesale selling price of a car from which standard equipment has been removed, by an amount not less than the cost of such removed equipment to the manufacturer.

New regulations governing the use of crude rubber permit manufacturers

of certain automotive parts to consume 75 per cent of the average monthly consumption for the 12 months ended March 31, 1941. These parts are: Hydraulic - brake - cylinder parts, excepting boots; hydraulic-brake hose; air-brake and vacuum-brake parts; torsional vibration dampers; clutch facings, brake linings and brake blocks; shock-absorber bushings; steering-post alignment bushings; Pitman-arm bushings for independent suspensions; steering

box-to-frame pads for independent suspensions; windshield-wiper blades and pivot-to-housing gaskets; suspension and torque-arm bushings; engine, transmission and propeller center bearing mountings; remote control gearshift bushings; spring bumpers, front and rear; cements and tie-gums (for bonding rubber to metal only); sealed beam gaskets; hydraulic clutch and throttle controls.

Makers of automotive fan belts for trucks, buses, tractors and farm implements may use only 30 per cent of the rubber consumed during the base period. Producers of full-circle and sectional airbags for repairing, retreading, and recapping tires may use 100 per cent.

Specific permission to use crude rubber must be obtained by manufacturers of compounds for insulating wire and cable, tires and tubes for passenger cars, trucks and buses (including road builders, earth movers and excavators), power-driven industrial vehicles, agricultural implements, motorcycles, bicycles, and airplanes, as well as camelback, capping stock, filler strip, stripping stock, cushion stock, lug stock, and base stock for retreading and recapping tires.

Minimum standards are being developed by the OPA Consumer Division for the various grades of camelback. Questionnaires have been sent all manufacturers, requesting information on the physical properties and composition of camelback which indicate its wearability and other quality factors. Wherever it is found that inferior tire-capping stock is being made, the Standards Section of the Consumer Division plans to assist manufacturers to bring their camelback up to minimum standards.

D. Edwin Gamble, of Chicago, vice-president and general manager of the Borg and Beck Division of the Borg-Warner Corp. has joined the staff of the Ordnance Branch, it is announced by the Production Division of the WPB. During World War I, Gamble was an engineer in the Army Air Service at McCook Field, now Wright Field, at Dayton, Ohio.

Further restrictions on the use of scrap and reclaimed rubber were announced last month by WPB. Its use is banned except to make products for which the use of crude rubber or latex is permitted, to manufacture a limited quantity of articles considered essential to civilian well-being, and to make during April only a short list of other products.

Among the articles for which reclaimed rubber may no longer be used are mud flaps and running boards for passenger cars and buses, trucks and tractors, blow-out patches, boots, and liners.

(Continued on Page 112)

## This is 1942 Merchandise

★  
QUICKLY  
SALEABLE  
★

Profitable NOW

**Dirt BUSTER**  
CAR WASH

List 35c each

DirtBUSTER is your way of making a profit even when your customers wash their own cars... you'll be surprised at the number who do.



CONSUMERS  
PACKAGE

★ Here is a car owner wanted item to help in their new problem of taking better care of their cars: DirtBUSTER is a welcome way of easily and quickly washing the car in about 1/4th the time usually required... simply wash... rinse... and let dry. And DirtBUSTER may be used for cleaning upholstery... and also many other cleaning purposes.

There are 18 35c smartly labeled packages of DirtBUSTER and a display card in each box... a retail value of \$6.30... a profit of \$2.52 for YOU. Get a trial box... from your jobber if he has it... (don't be gullible and accept a substitute)... send \$3.79 direct or a post card will bring a box parcel post prepaid.

For your own wash stand there's a special deal with a "500" Car Wash size of DirtBUSTER and a clever Dispenser that dishes out just enough to wash one car.

➔ **Free! Free! Free!** ➔

For the Guy "from Missouri"  
Here's What You Do—

Tear out this ad—write your name and address in the margin... We'll mail you prepaid a consumer package of DirtBUSTER free of charge. We'll also include descriptive literature describing the product and its uses.



### ANOTHER PROFIT!!

Special Deal on  
**DirtBUSTER**  
Trade Size

Special Dispenser  
with a "500" car  
wash tin of Dirt-  
BUSTER.  
"500" Car  
Wash ..... \$6.50  
Dispenser ..... 2.50

Total ..... \$9.00  
Both ..... 7.50

"500" car wash size  
= 4 gallons any  
liquid car wash.



Also, makers of RUSTBUSTER—cleans  
and rustproofs cooling systems without  
draining or flushing.

★ **CANNON** ★  
CHEMICAL CO., Inc.  
210 Broadway,  
Everett, Mass.

# U.S.

## *"War Time" Lube Maintenance Units*



# U.S. BRAND LUBRICATORS

U. S. specialized brand lubrication units are stripped down for action and to conserve important raw materials. They are as efficient and practical as any pre-war lubricating unit ever built. Never before has there been such a national need for a lube maintenance unit to keep cars and trucks operating at maximum safety and efficiency.

You can't keep "'em rollin'" if you don't keep 'em properly lubricated, their very life depends on lubrication, also the life of drivers and pedestrians. Here is an outstanding lube maintenance unit that is the very life-line of today's highway transportation.

U. S. portable, air operated chassis lubricating units are equipped with famous, air operated patented "Jack-in-the-Box" cover, so that the cover, pump, hose control nozzle and suction pump is automatically raised up out of the way while changing grease drums.

THE UNITED STATES AIR COMPRESSOR COMPANY - CLEVELAND, OHIO

AIR COMPRESSORS \* GREASING EQUIPMENT \* HYDRAULIC LIFTS



## OUR INDUSTRY AT WAR

(Continued from Page 110)

Products that may use reclaimed rubber in limited quantities include air hose for garages, and car-heater and radiator hose. In the case of these automotive products, the limit is roughly 80 per cent of the average monthly consumption of scrap for the three months ended Dec. 31, 1941.

This figure is determined by taking the average monthly consumption figure, adding 166 2/3 per cent of the average monthly crude or latex consumption for the same period, and multiplying by an arbitrary percentage, which in this instance is 30. Thus, if a maker of radiator hose consumed 100 pounds of scrap or reclaimed rubber per month in the last quarter of year, and another 100 pounds of latex or crude, he would add the 100 pounds of scrap to 166 2/3 per cent of crude, or a total of 266 2/3 pounds. Then, multiplying by 30 per cent, he would get 79.99 pounds, his limit per month henceforth.

During April, makers of automotive weatherstrip and channel filler, tail-pipe supports, battery drain tubes, brake boots, nipples for high-tension wiring, containers for batteries (SAE Group 4 and larger and

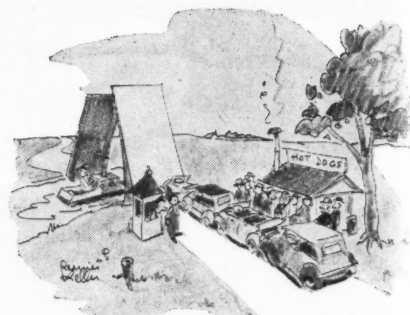
motorcycle types only), battery covers, vents, gaskets and bushings, and fan belts may continue to produce up to 60 per cent of the base figure. After April 30 specific allotments will be made.

Early this month a new priority form, to be known as PD-1X, will be made available to distributors, wholesalers and jobbers. The form is designed to help jobbers maintain sufficient stocks on hand to supply essential productive and service industries. Automotive jobbers are included among the suppliers entitled to use the new forms, which will not affect jobber sales to customers that have a priority rating.

A new order, to be known as L-63, limiting the size of inventories which may be maintained by jobbers, will be issued and published before the new PD-1X forms are made available.

\* \* \*

Relief for tire dealers and jobbers that find it too burdensome to carry a big stock of frozen passenger-car tires and tubes was offered recently in a new plan developed by OPA. Under the "Tire Return Plan" jobbers and dealers can sell their stock to the



"It costs me \$20 a day to keep the boat running back and forth but it's worth it."

original manufacturers or mass distributors at cost price plus 10 per cent. Manufacturers and mass distributors are required to make such purchases and to sell such repurchased tires and tubes to the Defense Supplies Corp. They are required also to sell to the Defense Supplies Corp. their own stocks of new passenger-car tires and tubes, except for a small working stock. They will have the option of repurchasing tires and tubes from the Defense Supplies Corp. when they wish.

\* \* \*

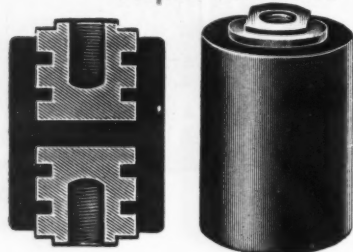
The ban on the use of bright work has been extended to all types of motor vehicles and trailers and its use has

(Continued on Page 116)

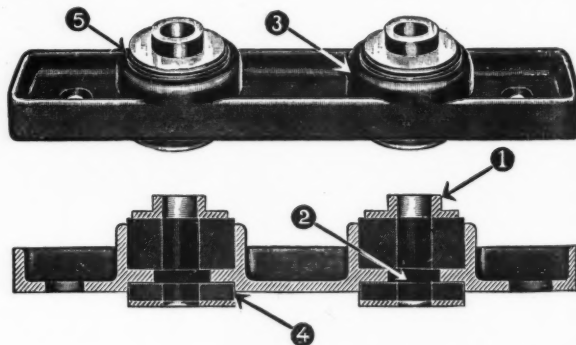
## Protect Precious Motors!

### No. 401

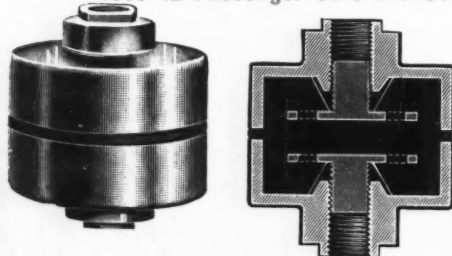
#### Improved Side Motor Mounting



"Eliminates clutch chatter." "Oil Proof." Oil and grease will not affect rubber cushion. No metal to metal contact. Installed in same manner as standard mountings. Will last life of the car. For 1935-42 Chevrolet passenger cars and sedan delivery trucks. List \$1.00 each.



### No. 954 Improved Front Engine Mounting for Chevrolet 1935-42 Passenger Cars and Sedan Delivery Trucks



"Oil Proof"—Shielded so that oil and grease will not contact rubber cushion. No metal to metal contact. Will last life of car. Replaces Nos. 595219 and 365929, Chevrolet. Patent No. 2,241,026. List \$1.50 each.

### No. 924 Improved Front Engine Mounting for Other Chevrolet Cars and Trucks

A service necessity when excessive float exists, causing front end of motor to strike cross member. Compensates for wear on the timing gear cover so as to permit proper clearance after installation. Eliminates all metal to metal contact. Improved design protects rubber bushings from oil contact. For 1932-33 passenger and '34 Standard and 1932-40, 1/2, 3/4 & 1 1/2 ton trucks. (Replaces Nos. 368447 and 371252.) List \$1.50 net.

ORDER FROM YOUR JOBBER



**CHAMP-ITEMS, Inc.**  
6191 MAPLE AVE., ST. LOUIS, MO.



IN YOUR RAZOR

REPLACE LID



DISPLAY THIS SIGN



FOUNDER AND LEADER OF THE OIL FILTER INDUSTRY

APRIL, 1942

When writing to advertisers please mention Motor Age

## INDUSTRY AT WAR

(Continued from Page 112)

been prohibited in replacement parts and accessories. As formerly, the prohibition does not apply to bright work in ventilator window latches, external locks, cylinder caps and covers, external windshield wipers, windshield wiper arm and blade assemblies, and body-trim screws.

\* \* \*

Much of the steel plates for the nation's merchant ships henceforth will come from mills that last year

were turning out sheet steel for automobile bodies, C. E. Adams, chief of the Iron and Steel Branch, WPB, announces. The plan for the use of plates from converted strip mills was worked out by representatives of the branch and of the Maritime Commission, and will go into effect immediately.

\* \* \*

Allotment of truck-type camelback has been increased by an amendment to the tire rationing regulations. An original allotment of 300 pounds of camelback is made retreaders and recappers for certain small-gage truck-tire molds, and the allotments for

molds capable of treating more than one tire at a time are made. Each machine capable of retreading or recapping two or more tires simultaneously will be allowed a maximum of 1500 pounds instead of 750 pounds as originally provided.

\* \* \*

The WPB has cracked down on graveyards that failed to accept offers for their obsolete cars and metal scrap. At Valparaiso, Ind., the entire stock of one yard's old cars have been requisitioned.

\* \* \*

Following up its order suspending production and delivery of tire-retreading and recapping equipment except when priorities have been granted, the WPB has issued a definite order to that end. The move was made, it was explained in January, to prevent tire-reconditioning equipment from finding its way into areas already adequately supplied.

In granting priorities on equipment, the WPB will be guided by:

1. The number and capacity of retreading and recapping equipment facilities now available in the locality covered by a request for a certificate;
2. The anticipated need for equipment in that locality;
3. The amount of camelback expected to be made available in the locality;
4. The existence of orders placed before Jan. 28 (the date of the freezing order) and the amount of work already done on those orders.

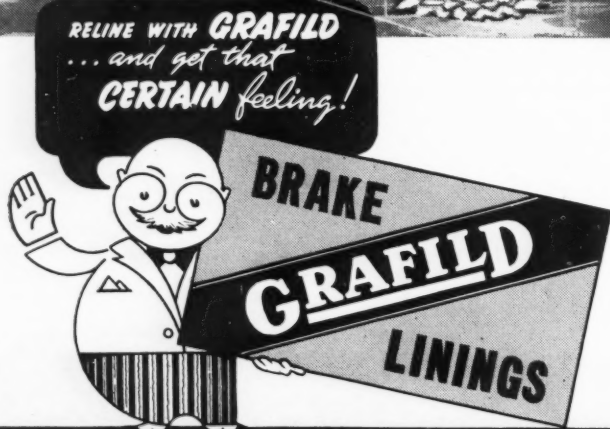
Restriction on production and deliveries will not apply to repair and maintenance parts. The order is not intended to apply to such smaller equipment as tube vulcanizers, spreaders, jacks, buffers, and other specified equipment.

### Trues Crankshaft Journals

Postma Mfg. Co., 691 East 18th St., Paterson, N. J., has introduced a crankpin truing tool said to recondition the connecting-rod bearing journal without removing the shaft from the engine. "Journalizers" fit in place of the insert bearing, and are said to operate equally well for light reconditioning work or for truing badly damaged journals. A universal kit which will service 90 per cent of motor vehicle engines excepting Ford engines carries a list price of \$5.00.

### Adjusts Camber

The Bee-Line Co., Davenport, Iowa, has a new camber adjusting tool which operates by hydraulic pressure, and can be used without removing the camber gage. This permits the operator to determine the correction as pressure is applied. The tool can be adjusted to various widths from 3 to 7 in., and is easy to use. In addition, the hydraulic jack can be used for other operations, such as frame straightening where space limitations require a small jack.



WORLD BESTOS CORP., Paterson, New Jersey

ROLLS  
SETS  
SLABS  
BLOCKS  
•  
CLUTCH  
FACINGS

# Break service "bottlenecks" with **Snap-on Tools**



## No. 488 SUPER SERVICE SET

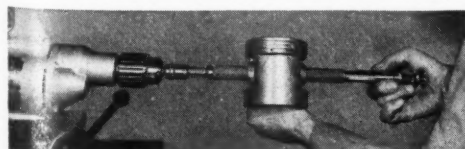
Contains every basic tool—151 units covering full range of socket wrench equipment from 3/16" to 1 3/4" inc., in four sizes of handle drives: (Midget, 9/32" drive) (Ferret, 3/8" drive) (Master, 1/2" drive) and (Heavy Duty, 3/4" drive).



**HYDRA-PAK BODY JACK**—No hose—no motors—no remote power connections. Power unit is right on tool itself where you can regulate pressure as you watch the work. 10-ton capacity. No over-riding. Handles all kinds of body and frame straightening.



**TORQOMETER**—Measures tension with absolute accuracy, no matter how you hold or pull. Simple to use—set dial at tension desired and tighten until dial reads zero. 150 lbs. capacity. Ratchet adaptor, optional.



**SPEED HONE**—Enlarges, trues and finishes holes in all types of bushings—in all kinds of metal. Hones both piston bosses at once. Operates on any 1/2" drill—speed sleeve for fast hand feed—no overcutting. .00025" accuracy. Capacity 11/16 to 1 1/2".

## More than 3000 Snap-on Tools from which to choose!

Now is when the right tools count ...and when Snap-ons count *most!* For with a complete outfit of Snap-on wrenches and selected Shop Equipment you are set to lick the toughest jobs quickly—to save time and parts—to "keep 'em rolling" economically and efficiently.

Snap-on Tools, for thousands of automotive service operations on cars, trucks and tractors are available to you thru 35 factory branches from which 550 Snap-on representatives travel daily routes, bringing tools direct to you to "see and try before you buy". See your Snap-on salesman, or write...

**SNAP-ON TOOLS CORPORATION**  
8036-D 28th Avenue • Kenosha, Wisconsin

# Snap-on

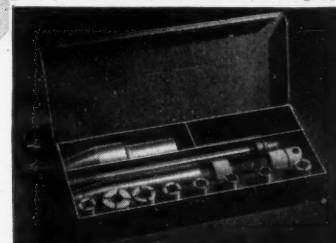
**SERVICE TOOLS**  
*The Choice of Better Mechanics*



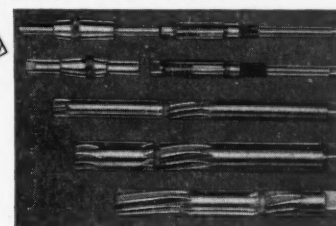
**UNIVERSAL STEERING WHEEL PULLER**—Pulls any steering wheel on any vehicle without marring parts. Fast straight-line power application. Adapters available for unusual types of wheels.



**UNIVERSAL PULLER**—Pulls large and small gears, sleeves, hubs, pulleys, flanges, Pitman arms, grease retainers, bearings, etc. Maximum large jaw capacity 6 1/4". Minimum small jaw cap. 1/4".



**CLUTCH ALIGNER**—Aligns any single disc clutch. Simple to use... locks in position in pilot bearing, permitting use of both hands for work. Pilot capacity .590" to 1.181".



**PRECISION REAMERS**—Complete line of all types—expansion reamers both long and short blades; solid reamers; aligning reamers in both expansion and solid types.



**ELECTRIC DRILL**—Only fist-wide (3 1/4") but full 1/2" drill capacity. Fully balanced with 100% anti-friction bearings, helical gears. 18 other Snap-on drills from 3/16" to 7/8".

## Nash Will Underwrite Cash Aid for Dealers

Nash Kelvinator will underwrite monthly cash advances to their automobile dealers throughout the United States to help them and their service organizations remain in business, it has been made known by Frank R. Pierce, vice president in charge of sales.

The Nash-Kelvinator plan will enable retailers to obtain an advance of \$10 per car a month every month until March 15, 1943, or until the cars are sold, Pierce explained.

The government, Pierce pointed out, will permit retailers to add one per cent a month to the retail sales price of the car for each month that the car was "frozen." The \$10 per car basis of the Nash-Kelvinator plan is approximately one per cent of the average retail price.

The Nash-Kelvinator arrangement, which starts with payments on, or after April 15, also is retroactive and will permit retailers to draw \$10 per car per month for the months of February and March also, Pierce stated.

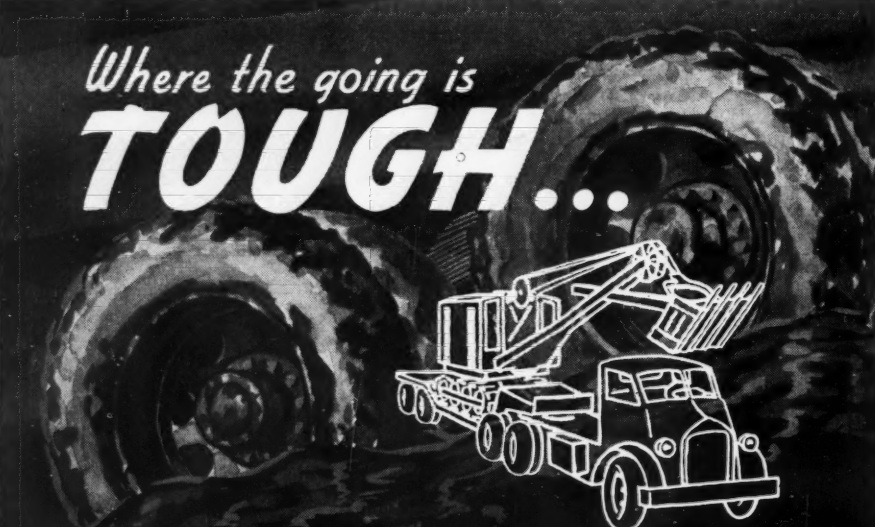
Nash-Kelvinator will underwrite

the plan, and will carry it out through the finance companies which serve Nash dealers. The corporation will pay the interest on the money, and the financial assistance will cost dealers nothing, Pierce stated.

## Stromberg Announces New Tachometer

E. A. Stromberg Co., Inc., 1160 N. Howe Ave., Chicago, Ill., has announced a new piece of tune-up equipment known as the Stromberg Syncro Tachometer. Operating direct from the high-tension system of

Where the going is  
**TOUGH...**



**COLLOIDAL GRAPHITE**  
*prolongs gear life.*

"'Dag' colloidal graphite is used in the jackshaft assembly of Sterling dual-drive trucks, built principally for off-the-highway operation where the going is tough. Ordinarily the wear would be excessive, but due to the graphite film on the gear teeth, friction and heat are defeated and gear life prolonged."

... Sterling Motor Truck Co., Inc.,  
Milwaukee, Wis.


Write for Bulletin No. 92S entitled "Colloidal Graphite Lubricants."

The electric-furnace graphite in "dag" products is made in the U. S. A.


**ACHESON COLLOIDS CORPORATION**

PORT HURON, MICHIGAN

"dag" is a registered trade-mark



of Acheson Colloids Corporation.




the car, the tachometer can be used to accurately set ignition timing, engine r.p.m., and to locate trouble caused by inoperative distributor spark advance, to indicate engine r.p.m. for setting voltage regulators, carburetor adjustments and for other operations of an engine tune-up. Operates from the spark plug, but does not interfere with plug firing.

## Valvoline Offers Sales Helps

To assist repair shops to develop new business and to keep accurate records of shop sales of lubricants, parts, accessories and labor, the Valvoline Oil Co., Cincinnati, Ohio, has developed a number of forms which it has made available to Valvoline users at a nominal cost. These service helps include a series of postcards for owner follow-up, a golf-bowling record book, cleaning towel, daily break-down record form for sales classification, a monthly recap sheet and a progress analysis form, and many others that are designed to promote increased lubrication business and at the same time provide the service manager with an accurate record of performance.

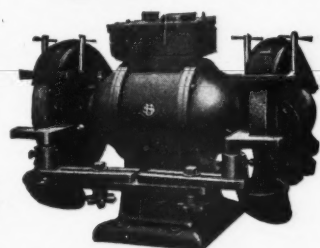
Also available is new 1942 Lubrication Recommendation Chart booklet giving lubricant recommendations for passenger cars, trucks, tractors, marine, aviation and industrial engines, etc., covering the years 1937-42.

THANK GOODNESS for the



"Silver  
Lining"

## TUNE-UP JOBS



WITH MILLIONS of car-owners compelled to be "mileage conscious" and every car a treasure that money can't buy . . . your tune-up business is bound to be terrific. Be prepared with equipment that will help you DO MORE JOBS . . . QUICKER . . . MORE ECONOMICALLY . . . MORE PROFITABLY.

## BENCH and FLOOR GRINDERS

### BALL BEARING

For all kinds of edge tools and general purpose grinding . . . for continuous service . . . regular and heavy duty models.

Totally enclosed motors have no commutators, brushes or centrifugal switches. Will not burn out though overloaded repeatedly. Run for years without servicing.

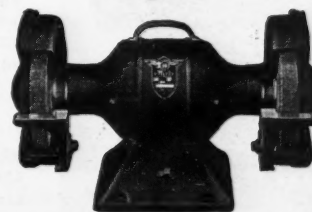
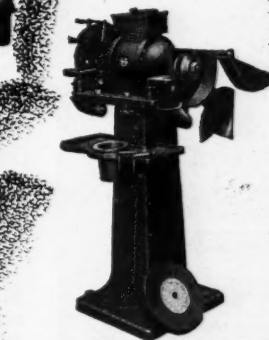
With adjustable safety eye shields and lamp, if desired.

Get catalog for full details.



THE UNITED STATES ELECTRICAL TOOL CO.

CINCINNATI, OHIO, U.S.A.



United States Electrical Tools

## Dealer "Idea Exchange"

### Inaugurated by Dodge

With new vehicle sales extensively curtailed by wartime restrictions, automobile dealers of America are developing a new resourcefulness in merchandising that promises to mark a real milestone in the retail automobile business, according to F. H. Akers, vice president and director of sales, Dodge Division, Chrysler Corp.

Factual evidence of the ingenuity of dealers is revealed in a Dealer Idea Exchange just inaugurated by Dodge, Akers stated. Field repre-

sentatives and the factory sales and advertising executives, he said, are compiling detailed reports on new merchandising ideas that have proved resultful for dealers in various parts of the country. Functioning as a clearing house, the factory passes these ideas along to all other Dodge dealers in bulletins issued twice monthly.

"An excellent example is the 'Victory Kit' developed by one of our dealers in a midwestern city," said Akers. Offered at a unit price, the kit contains such items as a fan belt, radiator hose, windshield wiper blades and spark plugs. It meets the



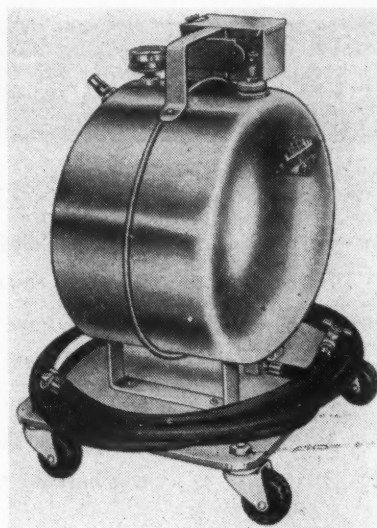
"I'll change the tire for you, but that's all the changing I'll do!"

demand created by the realization on the part of a large number of car owners that they may be required to do an increasing amount of emergency road service themselves.

"This is just a sample of a veritable flood of new merchandising plans being put into effect by our dealers everywhere."

### Dirtbuster Car Wash

Cannon Chemical Co., Inc., 210 Broadway, Everett, Mass., has produced a small six-wash consumer package of its Dirtbuster, a highly concentrated car wash. It is claimed that this product lifts off dirt and grease spots from the metal, making the operation of car washing quick



and easy, since it does not require chamoising. Dirtbuster is also said to be suitable for removing spots or for shampooing upholstery, seat covers and fabric tops. A small amount of Dirtbuster in solution makes a windshield, glass or chromium cleaner. In addition to the consumer-size package, Dirtbuster is also available to the trade in 90-wash cans, 500-wash cans, and 1250-wash cans.

**For the Defense of Car and Country**

**NIEHOFF** MAKES IT EASY TO SAY

**CARE WILL SAVE YOUR CAR!**

**... "JOIN UP" TODAY  
HELP KEEP CARS ROADWORTHY  
ON THE HOME FRONT**

Ask your Jobber at once for this NIEHOFF FREE Display Material that sounds the bugle call for Home Defense.

Make your shop a base for arming motorists against wasted oil, gas, power and needless wear on moving parts by topping off each "Tune-Up" job with Genuine NIEHOFF Parts. This complete campaign—"Care Will Save Your Car"—can be yours free of charge. Ask your jobber TODAY.

**C. E. NIEHOFF & CO.**  
4925 W. Lawrence Avenue, Chicago, Ill.

BRANCH:  
1342 S. Flower St.  
Los Angeles, Calif.

**TAKE OFF with NIEHOFF TODAY**

**NIEHOFF**

Illustration of a man in a cap and bow tie talking on a telephone, with various car maintenance items and signs around him, including: LAPEL BUTTON, WINDSHIELD STICKER, POSTER STAMP, WALL STREAMER, TUNE-UP Check Chart, AUTO SERVICE, CARE-SAVE-CAR, and NIEHOFF Parts.

Look for this ad in the April 13<sup>th</sup> issue of **LIFE!**

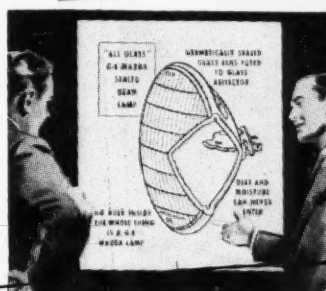
THEY'RE YOUR CUSTOMERS!

## To War Workers and others who must drive at night!

HOW BETTER LIGHT FOR YOUR CAR CAN MEAN GREATER SAFETY, FEWER ACCIDENTS, MORE TIME FOR VITAL WAR WORK



THIS IS NEWS TO MOST DRIVERS!



1 **THIS MAN IS LOOKING** at an invention that has made night driving safer for millions. It's the "all-glass" General Electric Sealed Beam headlight lamp. Instead of a separate lens, reflector, and bulb, the whole thing is one big hermetically-sealed G-E MAZDA lamp!

2 **WHAT DOES THIS MEAN** to night drivers? 50% more light on the road to start with than old-type headlights! Since bulb-blackening is practically eliminated, and dirt and moisture can't get in to dull reflectors, loss of light is almost nil!

3 **IF YOU DRIVE A '40, '41, OR '42 CAR**, make sure you use "all-glass" G-E MAZDA Sealed Beam lamps for replacement in headlights. Whatever car you drive, you can improve lighting by having headlamps aimed twice a year, keeping lenses wiped clean.

ARE YOU SET TO DO THIS?



Look for the initials "G-E" on the lens.

**G-E MAZDA AUTO LAMPS**  
GENERAL ELECTRIC

Always dim your lights when meeting other cars

FOG LAMPS THAT REALLY HELP!

4 **ON PRE-1940 CARS**, your service man can install "all-glass" G-E MAZDA Driving and Passing lamps to supplement present headlights. Or on most models, you can buy adapters which include Sealed Beam lamps to replace present headlights.

5 **WHEN FOG BOTHERS YOU**, be prepared with a pair of new G-E MAZDA Fog lamps. They really help! Stripes on edges of lens prisms and a shield over filament practically eliminates "stray light" which is normally reflected back in your eyes from moisture particles. Same "all-glass" construction as G-E Sealed Beam lamps.

GET yourself a copy of the April 13th issue of LIFE magazine and read every word of this full-page G-E MAZDA Auto Lamp advertisement! With more people working on night shifts and using their cars to drive to and from work, accidents are bound to increase . . . unless something is done about it. This ad suggests several things you can do to help give your customers safer night driving.

LIFE magazine has a circulation of about 3,500,000, and surveys indicate that nearly 22,000,000 people

read every issue. A lot of your customers will see this G-E MAZDA Auto Lamp advertisement. Tie-in with it by putting it up on your wall or window where a lot of people will see it. Better check your stock of "All-Glass" G-E MAZDA Sealed Beam, Driving and Passing, Fog, and other lamps.

**G-E MAZDA LAMPS**  
GENERAL ELECTRIC

When writing to advertisers please mention Motor Age

APRIL, 1942

### Sackett Joins SAE Staff

Ray C. Sackett joined the headquarters staff of the Society of Automotive Engineers on March 9 to assist in the accelerating SAE war program which has developed at an increasing pace since United States' entry into the conflict. Sackett will have his headquarters in the New Center Building, Detroit, and will devote particular attention to working with the SAE War Engineering Board, although he will participate as well in other phases of the board program now being carried forward under the SAE War Activity Council,

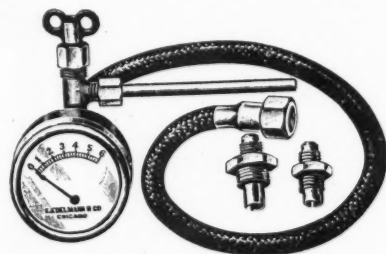
supervising agency of all the society's war work. Sackett was graduated from the University of Michigan in engineering, and for the past eight years was head of the public relations department of MacManus, John & Adams, Inc.

### Perfect Circle Dividend

The directors of The Perfect Circle Co. declared a dividend of 50 cents per share on the 162,500 shares of outstanding capital stock of the company on Feb. 27. The dividend is payable April 1, 1942, to stock of record at close of business March 17, 1942.

### Fuel Pump Tester

A new fuel pump tester, No. 92, has been introduced by E. Edlmann & Co., 2332 Logan Blvd., Chicago, Ill. Simple and rapid in operation, the new tester is particularly designed to check the operation of AC fuel pumps, and shows capacity and pressure.

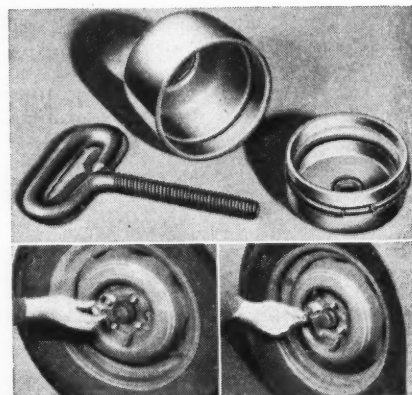


### Aids Cylinder Head Removal

A plastic cup, known as Rose-Cups, has been developed by Anti-Rust Corp., 340 Canal St., New York City. The cup is designed with a molded thread for either 7/16 in. or 3/4 in., and fits on the cylinder head stud. A new penetrating solvent, known as Rozene, is used in the cup, and a rubber seal at the bottom prevents leakage. It is claimed that Rozene, held in the Rose-Cup, will penetrate around the stud and dissolve the corrosion between the head and the stud so that the head can be easily removed.

### Locks Wheel to Hub

The Rex Tire Watchman is a new product introduced by Rex Manufacturing Co., Racine, Wis. As illustrated, it consists of a metal cup through which the hub bolt is placed. The bolt is then tightened in the regular way. A cap is then snapped into the cup, held in place by a snap ring which fits into a groove on the inside



of the cup, effectively covering the head of the hub bolt so that it cannot be removed until the cap is removed. A special threaded key is provided to screw into the cap to force it out of the cup. Supplied in a set of five, at a list price of \$3.00 per set.



**Here's a timely tip to pass on to customers--**

### In case of a flat -- quick use of a HEIN-WERNER HYDRAULIC JACK

**may save tire and tube from total loss**

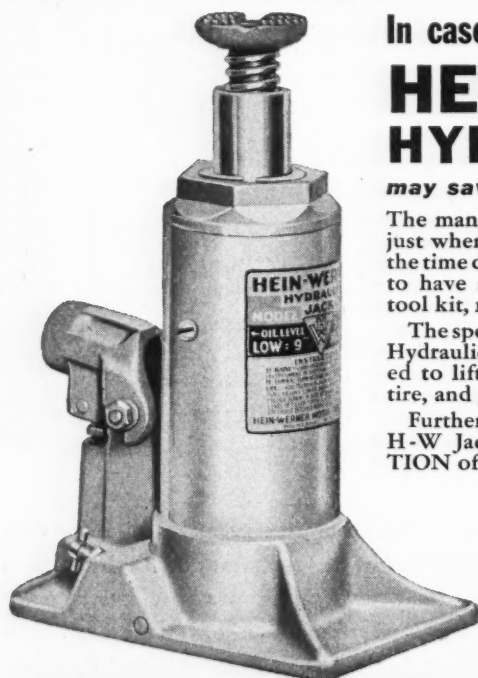
The man at the wheel never knows in advance just when he may have to change a tire. But when the time does come, it's "worth its weight in gold" to have a Hein-Werner Hydraulic Jack in the tool kit, ready for instant service.

The speed and ease of operating a Hein-Werner Hydraulic Jack cuts down the "lost time" required to lift the tire clear of the road, change the tire, and get the job rolling again.

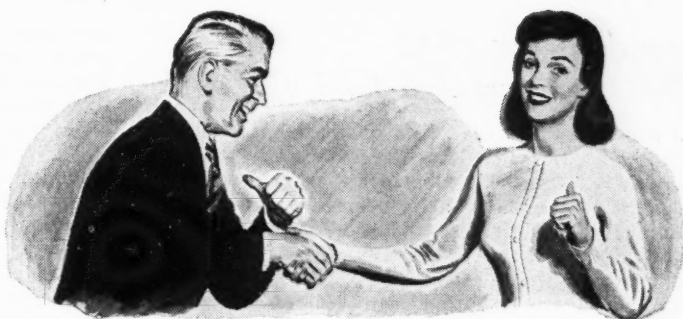
Furthermore, a driver should consider how a H-W Jack can contribute to the CONSERVATION of TIRES. No need to drive on a flat and possibly ruin tire and tube. Loads can be lifted "on the spot" and tires quickly changed.

Complete H-W line includes hydraulic jacks of 1½, 3, 5, 8, 12 and 20 tons capacity.

**HEIN-WERNER MOTOR PARTS CORP.**  
Waukesha, Wisconsin

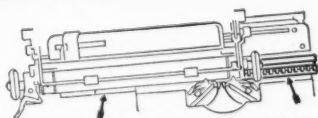


**HEIN-WERNER  
HYDRAULIC JACKS**  
*Are Built Right and Priced Right*



## My boss and I are in there pitching!

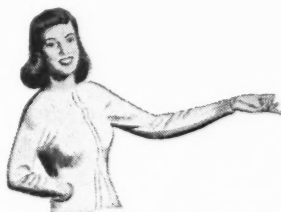
### Here's what I do every morning



1. Run carriage to the extreme left, and wipe carriage rails or "tracks" (upper and lower) with dry cloth. Repeat operation after running carriage to the extreme right. At the same time wipe carriage roll or rail, on the back of the machine.



2. Wipe slots in segment (that's the curved metal frame work in which the type bars move) with dry cloth—wiping towards you so as to clean thoroughly.



3. Clean type, using bristle type-brush. If you do this daily you can keep your type perfectly clean without using gasoline or benzine. Should you find it necessary to clean type with a cleaning fluid, use it very sparingly.

P.S.—Don't forget it pays to buy the finest typewriter ribbons and carbon papers. Be sure to specify Roytype\*—they're made by Royal.

**MR. EXECUTIVE:** Have the stenographers and secretaries in *your* office follow the above simple rules. It is also to your advantage to sign a Maintenance or Service Contract with the Royal Typewriter Company or its sales representative. Under these contracts, obtained on a 1, 2, or 3-year basis, Royal promises to inspect, clean, and adjust your typewriters four times a year, and to replace *free* all worn-out parts, other than rubber parts. Call your local Royal representative *today!*

## ROYAL World's Number 1 TYPEWRITER

IN OUR BUSINESS, my boss and I need typewriters . . . but so does the Government. And right now, Uncle Sam comes first.

Our Armed Forces and Civilian Defense need thousands and thousands of typewriters. Uncle Sam is ordering typewriters so fast that it's hard for a man like my boss to buy a new machine. But that's all right—we'll just make the typewriters we have *last longer!*

My boss asked the Royal Typewriter Company how to make a typewriter last longer, and they sent us a few simple rules. I follow these rules every day, with the result that my machine *runs smoother and easier*, is more fun to work on. It will require *fewer repairs, less servicing*, and the boss won't have to worry about replacing it nearly so soon.

### Here's what I do once a week



1. Hold paper table or paper deflector forward, and wipe off nickel rods with a cloth slightly moistened with a little oil.
2. Clean out carriage rails or "tracks" using same cloth slightly moistened with a little oil.
3. Clean cylinder or roller with a cloth moistened with a little denatured alcohol. (This is important as it will prevent paper from slipping.) Do not use benzine or gasoline for cleaning roller.



\*Trademark Reg. U. S. Pat. Off.  
Copyright 1942. Royal Typewriter Company, Inc.

## Tires No Cause for Worry During 1942

### MEWA Members Are Told by Loock

Expressing the conviction that confusing and conflicting statements about the situation in rubber has had an unwarranted and damaging effect on public morale, Robert J. Loock, president of the Motor and Equipment Wholesalers Association, recently presented telling facts in support of the view that the outlook as applying in 1942 is not as bad as some people apparently would have the public believe. He admonished members of the association not to

worry too much about the tire situation in 1942.

Loock's statement, concise and to-the-point, as contained in a special bulletin to MEWA members, follows:

"Don't worry too much about the tire situation in 1942. It will be a long time before a noticeable amount of cars and trucks stop running. Remember these facts:

"(1) During 1940 and 1941 there were 9,307,915 cars and trucks made

and sold which was the largest two years' sales in the history of the automobile business. All of these cars and trucks had five or more new tires.

"(2) There were more new tires, automotive only, made and sold—the huge total of 120,728,738—during 1940 and 1941 than any previous two years.

"(3) The life of tires average from 20,000 to 35,000 miles.

"(4) The average car owner drives less than 8,000 miles a year. (5) With extra care tires can be and will be made to run and last longer. (6) Tires which ordinarily have been consigned to the junk pile will be repaired and used. Blow-out patches and reliners are being sold by the thousands.

"Considering these facts there will not be as many cars laid up because of the lack of tires during 1942 as some would lead you to believe. Again we say—Don't worry too much about the tire situation for 1942."

### "Doc Grafild" Returns

The World-Bestos Corp., Paterson, N. J., is popularizing its new trade character in many ways. The latest appearance of the "Little Doc" is on a group of new dealer helps the company is distributing—a gummed address label, a blotter, and a brake shoe tag that shows "Doc" shouting; "These brake shoes have been relined with Grafild Brake lining."

The management is offering these pieces free to all Grafild accounts.

### Spark Plug Chart

Spark plug specifications for practically every internal combustion engine made and every passenger car as far back as 1928, can be found in an attractive and valuable wall chart now being distributed by the Merchandising Division of The Electric Auto-Lite Co., Fostoria, Ohio. The new chart, 14 in. x 10 in., also includes correct distributor gap setting specifications for cars produced since 1930. Featured on the chart's cover is a reproduction of Auto-Lite's brilliant highway sign.



KEEP TOOLS  
In Apple Pie  
Order  
with

**HALLowell**

## TOOL STANDS and CABINETS of STEEL

Ideal for keeping  
tools handy along-  
side of machines  
... same time and  
steps.



Fig. 705 Pat'd. and Pat's. Pend'g.  
Standard Tool Stand

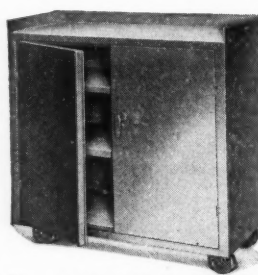


Fig. 1748 and Pat's. Pend'g.  
DeLuxe Tool Cabinet

"Hallowell" makes a complete line of work-benches, foreman's desks, tool cabinets, chairs and stools ... sturdy construction ... refined design ... reasonable prices. Write today for details.



Fig. 732

Pat'd. and Pat's.  
Pend'g.  
Drawer is extra.

**STANDARD PRESSED STEEL CO.**

JENKINTOWN, PENNA. BOX 561

— BRANCHES —

BOSTON • DETROIT • INDIANAPOLIS • CHICAGO • ST. LOUIS • SAN FRANCISCO

## NEWS

(Continued from Page 68)

Dealers lacking machines can still obtain them, McCormick declared. A Baltimore, Md., dealer found 4,000 idle machines in 125 different shops, and is now farming out sub-contracts to such shops. Other dealer shops have been able to buy \$3,000 to \$30,000 worth of new machines.

### TRAILER BOOM

ONCE more there is a boom in trailer building—but with a difference. Trailers built a few years ago were built for pleasant traveling. Those being built today are for housing war workers. The industry this year is expected to build 50,000 units, a new record.

For use on these trailers, only 4000 tires and tubes have been available. This means that tires will be used only to transport the trailers from the factories to their more or less permanent location near war plants. The tires will then be removed and the trailer blocked up. The House Trailer Section of the Lumber and Lumber Products Branch of the WPB is even trying to perfect a wooden wheel and another that uses a steel rim over an

"One half gallon, please!"



old rubber tire as substitutes for rubber-tired wheels.

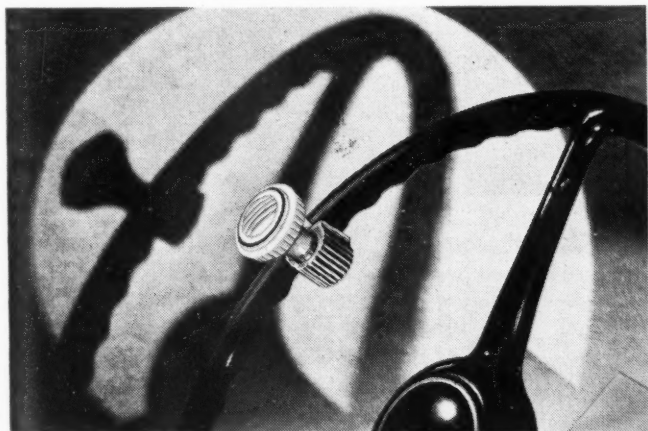
### CUT SPEED, CUT WEAR

WHEN the President last month asked the governors of the 48 states to reduce speed limits for the duration, he was actuated by a desire to keep the country's automobiles functioning as long as possible. The move had been under consideration for some time, as reported in MOTOR AGE in January, and is based upon the fact that high speed is destructive

of rubber and wasteful of gasoline. The lower speed limit will have the further welcome effect of prolonging the period during which the serviceman can sell maintenance and repairs for the cars now on the road.

It cannot be repeated too often that the service market is dependent upon the operation of motor vehicles. Owners shouldn't require much compulsion to make them observe the new limit, in which all states are likely to concur; their common sense should tell them that a minute saved

(Continued on Page 126)



### Engineered FOR LONGER, BETTER SERVICE

You can sell the No. 110 De Luxe Spin-Ur-Wheel Control with confidence as the finest, most attractive Spinner ever built! The beautiful plastic knobs (with inlays in contrasting colors) are RIVETED to the base. Equipped with a flexible metal band, it can be installed very quickly on most steering wheel rims. Made in 6 colors . . . also No. 10 Gear Shift Balls to match. Your market for this item is limited only by the number of steering wheels in your trade area. Order now, far in advance.



PRECISION  
ENGINEERED

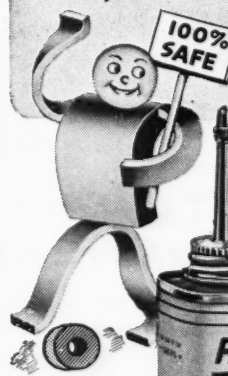
**Sinko**

AUTOMOTIVE SPECIALTIES

**SINKO TOOL AND MANUFACTURING COMPANY**

351 NORTH CRAWFORD AVE. • CHICAGO, ILLINOIS

### DAN, THE RUBBER MAN, SAYS...



**STOP RUBBER SQUEAKS  
THE SAFE WAY!**

with **RUGLYDE**

. . . The rubber lubricant approved by leading oil companies and rubber manufacturers.

RUGLYDE penetrates the tightest fittings . . . furnishes a tough, viscous film which lubricates and preserves rubber. Lasts the life of a lube job.

Sold by your jobber in 8-ounce refillable applicator cans, in gallon refills and 5-gallon drums.



**SAFE ON RUBBER**  
Lubricates and preserves.

**SAFE ON CAR FINISH**  
Won't harm the finest lacquers.

**SAFE ON SERVICE MAN**  
Non-flammable  
Non-poisonous



For rubber door seals, hood lacings, and other parts requiring surface lubrication, use DOOR-EASE Stainless Stick Lubricant. Won't soil clothing or upholstery. Won't harm rubber or car finish.

**AMERICAN GREASE STICK CO., MUSKEGON, MICHIGAN**

Canadian Sales Representatives

COLONIAL TRADERS, Ltd., 144 FRONT STREET W., TORONTO

## NEWS

(Continued from Page 125)

today is an hour lost in the life of their car.

Servicemen interested in "keeping 'em rolling" will lose no opportunity to remind owners that the old saw about haste making waste was never so true as it is today.

### TRANSPORT

**T**HE real problem . . . is not merely whether the railroads can do their

share, and handle the increased service required by war activities, but whether they can also take on a large part of the transportation load represented by the contributions of the automotive industry. When it is remembered that automobiles have provided 90 per cent of the passenger facilities of the country, and that motor trucks have carried almost a third of the freight traffic, it is evident that any serious decline in the use of automotive facilities will throw extra burdens on the railroads which it might be impossible for them to handle.

Thus the maintenance of automotive transportation becomes more than a desirable objective—it is an essential of successful wartime management of our basic facilities. The problem of keeping passenger cars and motor trucks rolling, in so far as their necessary services are concerned is one which cannot be disposed of merely by saying that other industries have first call on the metals and rubber which they normally consume. Manufacturing products is not enough—they must be transported to the places where they are needed and must be used.

There is no ready-made, easy answer for this problem, but the right answer must be found. Conservation of tires now in use and proper maintenance of automotive vehicles will help, of course, but the WPB must find a better method than has thus far been devised to make available for automotive use the tires and other equipment which are required to keep our essential transportation facilities in the automotive field going on an adequate basis. This we are sure must and will be done.—*Advertising Age.*



## GET BACK IN THE BLACK with this Surefire Profit Maker!

### HYPRESSURE JENNY Steam Cleaner makes money FOR YOU 3 WAYS!

The anxiety of your customers to make their cars last "for the duration" is as acute as your desire to stay in business and make a profit! Both of you can benefit with HYPRESSURE JENNY Steam Cleaner. Customers' cars last longer, perform better; you regain dollars lost in vanished new car, tire and accessory sales, reduced gallonage, etc. When you use HYPRESSURE JENNY you make money in 3 new ways:

- 1 10 to 15 minutes' work brings \$1.50 to \$3.00 for cleaning an engine or chassis like new . . . removing grease and dirt, often uncovering defects that can be repaired before causing serious trouble.
- 2 On overhaul work . . . especially "flat rate" jobs . . . JENNY cleaning before repairs earns up to 40c MORE out of each repair dollar by saving 25 to 40% of mechanics' time usually lost fighting dirt and grease.
- 3 Used cars, cleaned spic and span with HYPRESSURE JENNY, bring \$15 to \$50 more. They move "off the floor" faster, too. This fact has been established by used car dealers the country over.

Investigate HYPRESSURE JENNY profit possibilities at once! . . . . . Write to

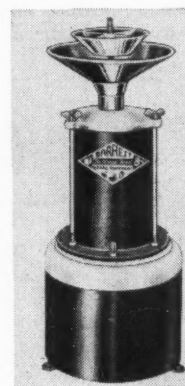
**HYPRESSURE JENNY DIVISION OF**

**HOMESTEAD VALVE MFG. CO.**

P. O. BOX 95 • • • CORAOPOLIS • • • PENNSYLVANIA



### Bearing Washer and Packer



The Barrett Equipment Co., 2101 Cass Ave., St. Louis, Mo., has introduced Model B-514 front wheel-bearing washer and packer. This particular model is especially adapted to truck work, having a range from small bearings up to bearings as large as 9½ inches.

### NSPA Picks Committees

R. L. Terry, president of the National Standard Parts Association, has announced the personnel of important committees which will direct the wholesaler-manufacturer organization's expanded program of regular and special industry activities throughout 1942. Chairmen of the several committees are:

Marketing Research: R. H. Hart, Jr., Chattanooga, Tenn.

Membership: F. C. Bradley, New Haven, Conn.

War Industry: T. L. Ford, Baltimore, Md.

International Trade: F. E. Halloran, Detroit, Mich.

Finance: R. L. Terry, Sioux City, Iowa.

Wholesalers' Board of Governors: W. J. Menghini, Springfield, Ill.

Manufacturers' Board of Governors: H. W. Knapp, St. Louis, Mo.

# INDUSTRY ANSWERS THE CALL!

32,145 Firms With Over  
17,700,000 Employees  
Have Installed the . . .  
**PAY-ROLL SAVINGS PLAN**



## Have YOU Started the Pay-Roll Savings Plan in YOUR Company?

Like a strong, healthy wind, the Pay-Roll Savings Plan is sweeping America! Already more than 32,000 firms, large and small, have adopted the Plan, with a total of over seventeen million employees—and the number is swelling hourly.

*But time is short!* . . . More and more billions are needed, and needed fast, to help buy the guns, tanks, planes, and ships America's fighting forces must have. The best and quickest way to raise this money is by giving every American wage earner a chance to participate in the regular, systematic purchase of Defense Bonds. The Plan provides the one perfect means of sluicing a part of ALL America's income into the Defense Bond channel regularly every pay-day in an ever-rising flood.

Do your part by installing the Pay-Roll Savings Plan now. For truly, in this war, this people's war, **VICTORY BEGINS AT THE PAY WINDOW.**

### Plan Easy to Install

Like all efficient systems, the Pay-Roll Savings Plan is amazingly easy to install, whether your employees number three or ten thousand.

For full facts and samples of free literature, send the coupon below—today! Or write, Treasury Department, Section C, 709 Twelfth Street NW., Washington, D. C.

**MAIL THIS COUPON NOW**

Treasury Department, Section C  
709-12th St., NW.  
Washington, D. C.

We want to do our part. Please  
rush full information regarding  
the Pay-Roll Savings Plan.

NAME . . . . .  
POSITION . . . . .  
COMPANY NAME . . . . .  
ADDRESS . . . . .  
NUMBER OF EMPLOYEES . . . . .



**MAKE EVERY PAY-DAY . . . BOND DAY!**  
**U. S. Defense BONDS ★ STAMPS**

GPO 16-26944-1

Form No. DSS-280

**F**OLLOWING is a brief digest of important articles appearing in this issue of MOTOR AGE. Read the digest and discuss the service procedure with your customers.

### HE, TOO, HELPS WIN THE WAR

After four months of war, everybody is willing to admit that our successful prosecution of the war demands that automobiles be kept in operation. The man charged with the



responsibility for keeping them running is the serviceman. His job is two-fold. He must be on his toes to see that competent service is rendered promptly under the present difficulties, and he must constantly educate the driving public to the necessity of bringing their cars in regularly for inspection and service to eliminate needless breakdowns. The article meets the present need for getting down to facts, but they are far from being hard facts for the serviceman to take.

### WARTIME ECONOMY FROM COMPLETE TUNE-UP

This is a subject that interests every owner and at the same time opens up a profitable field for the service shop. Saving fuel and parts and obtaining maximum performance are things owners must have in wartime and things the serviceman can deliver. The article discusses points about which owners would like to be told and which servicemen ought to suggest to customers at every opportunity.

### LUBRICATE FOR LONGER CAR LIFE

With every prospect that his present car must last him for a year or two more, or even longer, the owner is more conscious of his lubrication



needs than ever before. This article cites several things that can be done to protect the car from wear and offers the serviceman some tips on convincing owners that lubrication in wartime must be regular and really complete.

### SPECIFICATIONS

Eleven whole pages of tune-up and repair data on passenger cars, trucks,

# JOBBER'S OF THE APRIL

**E**ACH year at the beginning of the driving season, MOTOR AGE has published an issue devoted to information and helps needed by servicemen in getting cars ready for summer use. This year spring arrives at the appointed time but service has assumed a significance never before known. The country is at war and the automobiles of the country and the men who service them have assumed greater responsibilities. So that the demands of wartime may be carried out more effectively, MOTOR AGE offers this War Service Issue.

In this issue, the serviceman will find the technical information upon which he has learned to rely, and at the same time forthright discussions of the many questions he is asking. He wants to know how he can do a bang-up job under difficulties, how he can make parts and materials go as far as possible, what sources of new business he can tap. These and many more questions are answered by the articles in this issue, which is one of the timeliest and finest MOTOR AGE has ever published.

industrial engines, and tractors built since 1936. These give the serviceman all the important data he needs to service the bulk of the cars, trucks, and tractors now in operation. Inclusion of tractor specifications is new, and decidedly valuable at this time, for tractors are likely to be-

come an expanding source of shop business during the war months.



# DIGEST MOTOR AGE

## HOW'S BUSINESS

A MONTHLY REPORT ON MAJOR ITEMS BY 500 JOBBERS

MARCH 1942

| NATIONAL TOTAL                  | Good | Fair | Poor | NATIONAL TOTAL                | Good | Fair | Poor |
|---------------------------------|------|------|------|-------------------------------|------|------|------|
| ACCESSORIES                     | Poor |      |      | REPLACEMENT PARTS             | Good |      |      |
| Abrasives.....                  | 53   | 97   | 29   | Axle Shafts.....              | 23   | 94   | 61   |
| Anti-Freeze.....                | 16   | 31   | 99   | Ball and Roller Bearings..... | 79   | 86   | 16   |
| Car Radio Sets.....             | 3    | 11   | 89   | Brake Lining.....             | 91   | 92   | 11   |
| Car Radio Accessories.....      | 3    | 12   | 86   | Bushings.....                 | 44   | 94   | 38   |
| Chains.....                     | 10   | 32   | 120  | Chains (Timing).....          | 27   | 91   | 63   |
| Heaters.....                    | 3    | 18   | 141  | Clutch Plates and Parts.....  | 101  | 64   | 18   |
| Horns.....                      | 2    | 26   | 119  | Fan Belts.....                | 143  | 56   | 10   |
| Lacquers.....                   | 45   | 98   | 37   | Gaskets.....                  | 138  | 50   | 8    |
| Oil Filters.....                | 106  | 75   | 13   | Gears (Rear Axle).....        | 37   | 87   | 57   |
| Oils and Greases.....           | 40   | 64   | 36   | Gears (Transmission).....     | 51   | 89   | 37   |
| Polish.....                     | 18   | 108  | 63   | Mufflers.....                 | 120  | 63   | 7    |
| Seat Covers.....                | 12   | 85   | 71   | Pistons.....                  | 62   | 95   | 29   |
| Thermostats.....                | 9    | 53   | 105  | Pins.....                     | 73   | 95   | 20   |
|                                 | 320  | 710  | 1008 | Rings.....                    | 114  | 66   | 10   |
| SHOP EQUIPMENT                  | Poor |      |      | Radiators and Cores.....      | 20   | 47   | 77   |
| Battery Charging Equipment..... | 25   | 63   | 84   | Spark Plugs.....              | 135  | 60   | 12   |
| Car Lifts.....                  | 3    | 13   | 131  | Springs (Chassis).....        | 29   | 61   | 61   |
| Car Washers.....                | 8    | 9    | 136  | Valves.....                   | 78   | 86   | 17   |
| Compressors.....                | 2    | 55   | 94   | Water Pump Parts.....         | 91   | 81   | 13   |
| Drills (Electric).....          | 37   | 64   | 61   | Engine Bearings.....          | 123  | 55   | 9    |
| Electric Testing Equipment..... | 9    | 51   | 99   |                               | 1579 | 1512 | 574  |
| Jacks (Garage).....             | 27   | 93   | 58   | ELECTRICAL UNITS              | Fair |      |      |
| Lubricating Equipment.....      | 7    | 48   | 110  | Armatures.....                | 66   | 85   | 23   |
| Paint Spray Equipment.....      | 7    | 62   | 95   | Batteries.....                | 102  | 77   | 19   |
| Tire Service Equipment.....     | 23   | 45   | 86   | Cable (Battery).....          | 100  | 84   | 17   |
| Tools Kits and Sets.....        | 38   | 63   | 58   | Coils.....                    | 64   | 100  | 24   |
| Valve Refacers.....             | 21   | 63   | 82   | Other Ignition Parts.....     | 101  | 88   | 9    |
| Wheel Aliners.....              | 16   | 45   | 101  | Fuses.....                    | 67   | 103  | 25   |
| Wheel Balancers.....            | 27   | 43   | 84   | Ignition Wire and Cables..... | 91   | 92   | 14   |
| Frame Straighteners.....        | 7    | 19   | 112  | Lamps.....                    | 92   | 93   | 16   |
| Headlight Testers.....          | 2    | 19   | 115  |                               | 682  | 702  | 147  |
| Welding Equipment.....          | 47   | 57   | 52   |                               |      |      |      |
|                                 | 299  | 812  | 1558 |                               |      |      |      |

### MOST ACTIVE LINES

| Positions of Leaders       | Feb. 1942 | Feb. 1941 | April 1941 | Positions of Leaders        | Feb. 1942 | Feb. 1941 | April 1941 |
|----------------------------|-----------|-----------|------------|-----------------------------|-----------|-----------|------------|
| Fan Belts.....             | 1         | 12        | 6          | Cable (Battery).....        | 11        | 14        | 17         |
| Gaskets.....               | 2         | 2         | 4          | Lamps.....                  | 12        | 6         | 14         |
| Spark Plugs.....           | 3         | 4         | 2          | Water Pump Parts.....       | 13        | 7         | ..         |
| Engine Bearings.....       | 4         | 3         | 5          | Brake Lining.....           | 14        | 15        | 8          |
| Mufflers.....              | 5         | 1         | 1          | Ignition Wire & Cables..... | 15        | 16        | 15         |
| Rings.....                 | 6         | 10        | 3          | Valves.....                 | 16        | ..        | ..         |
| Oil Filters.....           | 7         | 11        | 7          | Ball & Roller Bearings..... | 17        | 17        | 10         |
| Batteries.....             | 8         | 5         | ..         | Pins.....                   | 18        | ..        | 18         |
| Clutch Plates & Parts..... | 9         | 13        | 9          | Fuses.....                  | 19        | ..        | ..         |
| Other Ignition Parts.....  | 10        | 8         | 13         | Armatures.....              | 20        | ..        | ..         |

#### HOW ITEMS ARE RATED

"Most Active Lines" are chosen on the basis of the highest number of jobber reports indicating "Good" for the items selected among the twenty most active lines. "Activity" as used here has no bearing on volume, so the lists should not be interpreted as meaning the lines on which jobbers are enjoying the greatest volume. Most active lines are those which the greatest number of reporting wholesalers indicate are selling "considerably above normal" in their particular markets.

#### HOW TO READ THIS CHART

Information from which this chart is compiled is obtained monthly from a selected list of 500 wholesalers. Figures show the number of wholesalers reporting. Normal is taken as average sales for this month during the past few years.

Good—Sales considerably above normal.  
Fair—Sales slightly above or below normal.  
Poor—Sales noticeably below normal.

### PROLONGING TIRE LIFE

This is today's outstanding task, not only of the car owner but also of the serviceman. For the first time since the automobile was perfected, customers are willing to listen to a



sales talk on regular tire service and have developed an absorbing new interest in front-wheel alignment. Here's all the information the serviceman needs, both to perform an important job and to bring the facts home to his customers.

### CHECK THE ELECTRICAL SYSTEM

Under present conditions, the problem of maintaining or restoring the efficiency of the electrical system is not one of selling the customer new parts but of doing the job properly with the parts and materials available. It is a much simpler task than it seems at first glance, as this article proves.

### KEEP 'EM NEW WITH BODY SERVICE

New cars may be unobtainable for most persons but the urge has not diminished, and owners want a car as nearly new as possible. The quickest and cheapest way to get it is to have the appearance of their present car renewed. In this article, the serviceman will find help on preserving the appearance of finish, bright work, and of interior upholstery and trim.

### SAVE THE BRAKE LINING

Good braking is just as important as it ever was, but the war has brought a change in brake service. The object now is to keep as many cars as possible in service and, to do this, available parts and supplies must be stretched to the limit. The ways in which this can be done in brake service is the subject of this article.

### TUNE-UP MANUAL

Publication of this exhaustive yet convenient summary of the mechanical changes on the current models is an event in most of the country's service shops. This year the manual consists of 26 full pages of accurate data and valuable hints on procedure. Just as in previous years, the entire issue of MOTOR AGE will be kept handy for easy reference as long as the 1942 models are on the road.





# Thousands of Automotive Maintenance Shops Buy and Use Each Annual Edition of the **CHILTON FLAT RATE and SERVICE MANUAL**

**These are the most successful shops. They are the ones that make the most money. They do over 85% of the total repair and tune-up work on the Nation's 30 million cars and trucks.**

## WHAT THESE SHOPS SAY

They freely admit that a large measure of their success is due to their use of the Chilton Manual. "Could not stay in business without it"; "Impossible to know all the necessary facts this Manual supplies"; "Tells us how to charge and how to do every job."—these are typical of the hundreds of comments from users. One shop recently wrote they had continuously lost money and were headed for bankruptcy when they began to use the Chilton Manual, and that today they are the leading shop in their locality, and are making money.

## OVER HALF MILLION MANUALS SOLD IN 16 YEARS

This 1942 edition is the 16th edition. No Manual could survive for 16 continuous years unless it rendered a worthwhile service, because most of each year's users are the same shops that have used it continuously. And no Manual totals more than a half million copies distributed that has not delivered value to its users. The Chilton Manual holds the record for length of life and volume of copies sold of any Manual in the automotive field. If, indeed, not in every field.

## YOU CAN HAVE CONFIDENCE IN CHILTON INFORMATION

A Manual that supplies charges for labor and material must be accurate or you would lose money using it. A Manual that directs you on service procedure must supply reliable data or you would lose more than you would otherwise. Therefore, the only Manual to buy and use is a thoroughly trustworthy one. The Chilton Manual was the first Manual of its kind to be issued. It is the oldest service of its kind. It is the largest. More shops use it than any other Manual. It has long since become a respected institution of the maintenance trade. You can trust the Chilton Manual.

## REASONS FOR ITS RELIABILITY

The main reason is the Company behind it. Any Manual of any kind is nothing more or less than the concern that produces it. The Chilton Manual is a property of the Chilton Company, and the Chilton Company is the oldest and largest automotive trade publishing organization in the world.

The second reason is the men who make it. Chilton employs more editors than any other publisher. 10 men work all year to produce this Manual. All 10 are practical mechanics, former shop men themselves, who work out the problems and get their answers in the grease.

The third reason is that Chilton Editors themselves time-study the jobs they price, and the work they describe as to the best procedures. This Manual is not a paper and scissors compilation of material taken from every available source. It is original material that our Editors prove is correct to their own satisfaction before releasing it.

The fourth reason is that the Chilton Manual is printed in the Chilton Plant by the same printers who have now worked on 16 editions. None of the work is "farmed out" to other printers. We are the only publisher that prints such a Manual in its own Plant. This system keeps mistakes down to the absolute minimum.

## SUPPLIES BOTH CHILTON RECOMMENDED FLAT RATE LABOR PRICES AND FACTORY PRICES

Every repairman knows that he cannot make money on factory prices. He doesn't have to use them if he has a Chilton Manual. This gives him Chilton Prices, far more accurate and closer to the correct amount he should charge, but if he wishes to use factory prices, they are also given in the Chilton Manual.

## NEW \$2.00 PER HOUR FLAT RATE LABOR CHARGE

The 1942, or 16th Edition labor charges are based on a \$2.00 per hour rate. The rate for years has been \$1.80, but the new rate was used because of increased labor costs. Any rate in a nationally used Manual must be one that represents the average of all labor charges all

over the country. For the benefit of those shops that will charge less or more than \$2.00 per hour, a conversion table is supplied, as always, making it easy for anyone to decrease or increase the total job charge as per his own individual labor charge.

## ALL JOB CHARGES REVISED

Every flat rate page in Chilton's 1942 Manual has been completely revised for the \$2.00 rate, and all Chilton job charges have been brought up to date.

Every parts price page in the Manual has been entirely revised in accordance with the very latest prices issued by parts manufacturers. This is an entirely new Manual in every respect. Do not therefore figure that if you have the 1941 Chilton Manual that it will do. You must have the 1942 Edition, especially in view of the present conditions, that call for the most recent information. The surest way to lose money is to try to save the small amount that you pay for the most recent Chilton Manual.

## LABOR PRICES AND MATERIAL COSTS ON ALL CARS SINCE 1936

There is a price for every kind of repair job on every make and model for 7 years. All flat rate information on cars manufactured in 1936, 1937, 1938, 1939, 1940, 1941, 1942. And tune-up tables supply tune-up data on all makes and models back for 10 years, and in some cars, farther back than that.

## ALL THE LATEST FACTS ALL THE 1942 PRICES AND DATA

Everything—every price and fact you'll need to know. Some 1942 parts prices even are included, although complete 1942 parts prices will be sent users in a separate supplement later, when the prices have become sufficiently complete and settled to issue.

## 33% MORE PARTS PRICES

A tremendous number of parts prices have been added to this issue, and most of these additions are body parts prices, for which there is such a demand. And there will be many pages of Body Repair Flat Rate prices also. There are 34,500 Body and Wreck Parts alone. There are 390 parts per car model. There are 128 pages of Body Parts alone.

## 45,000 TRUCK FLAT RATE LABOR PRICES

The Chilton Manual not only supplies labor charges on all makes and models of passenger cars back for 7 years, but, in addition, furnishes the largest amount of labor prices on truck repairing available anywhere. Nowhere else, in any one Manual, is assembled 45,000 truck flat rate labor prices such as the Chilton Manual contains. With truck repairing the most profitable of all repair work, and with the present defense necessity for efficient and speedy truck repairing, this one part of the Chilton Manual makes it invaluable.

## BODY OPERATIONS—FLAT RATE CHARGES

These are so extensive that they run into 44 pages of text, covering all makes and models of cars made in 1936, 1937, 1938, 1939, 1940, 1941 and 1942.

These body operations charges are extremely important with body and wreck work being done in constantly increasing volume.

## EASIEST SYSTEM TO USE

The Chilton Manual has always been the easiest to use. It is deliberately kept simple in arrangement to save its users time. One illustration of this is our placing parts prices across the page from the complete job prices. Each left-hand page has the parts prices. Each right-hand page has the Flat Rate job charges so everything is all together—visible at a glance, not separated into two sections, that would compel you to refer back and forth endlessly.

In the 1941 edition, we arranged the Service material instructions both by make and model of car and by units, and cross indexed both. This method has won such approval that it is being continued in the 1942 Manual. Now, in addition, we have placed the Quick Reference Tune-Up Data together with the major overhaul information.

## 950 ILLUSTRATIONS IN SERVICE SECTION

This is the largest number of photographs and sketches that any Manual of its kind has ever supplied. It is larger than any number that will be supplied by any other Manual in 1942.

## GREATEST SERVICE MATERIAL EVER PUBLISHED

Detailed service instructions are furnished on every make and model of car under the name and model. First is supplied quick reference tune-up, step-by-step instructions on tuning up all cars. Then follows service directions on the units, liberally interspersed with sketches and photos.

To supplement the service data printed under the heading of each make and model of car, there is also supplied a complete section treating each unit in even more detail. Carburetors, Automatic Chokes, Fuel Pumps, Steering Gears, Front Wheel Alignment, Brakes, Shock Absorbers, Controls, Generators, Distributors—all units.

## TABLES

All essential specifications, clearances, measurements are arranged in many tables that you will refer to constantly, such as—Shock Absorber Capacity Chart, Distributor Advance Specifications, Cam Angles, Torque Wrench Readings, Bearing Oil Pressure Test Data, Tune-Up Specifications on older cars, Truck Interchangeable Unit Table, Truck Tune-Up Specifications, Truck Engine Specifications, Truck Front Wheel Alignment Specifications, Tractor Tune-Up Specifications.

## PLEASE NOTE

This is not a manual for car owners who do their own repairing, although it is easily understood and operated. It is edited for professional mechanics and for apprentice mechanics who are now learning the business in greater number than ever before. We do not advertise this Manual to the general public or to car owners or tell them that by its use they can avoid going to repair shops for many jobs they can do themselves.

The professional automotive repairmen are our only customers. They have supported the Chilton Manual for 16 years and made it an institution. We therefore confine its sale to professional repairmen and thus support the trade that supports the Chilton Manual.

## PLEASE NOTE ALSO

If you wish a Manual without waiting for the Chilton man who covers your section to deliver it, write to us. If possible, we will send the Chilton man to take your order. If this is not possible we will send you the Manual direct. We feel that you will be more satisfied, however, if you will wait for the Chilton man to call on you as he can go through the new Manual with you in detail, and thus render a definite service at the time of delivery. If he takes your order in advance of delivery, he can also tell you many things that cannot be covered by mail.

## NO INCREASE IN PRICE

Chilton Service will cost you the same as heretofore. Despite increased publishing costs on paper, ink, binding, editorial labor, and general overhead and taxes, we decided to maintain the same reasonable price. We know you would pay more but we are not asking you to pay more.

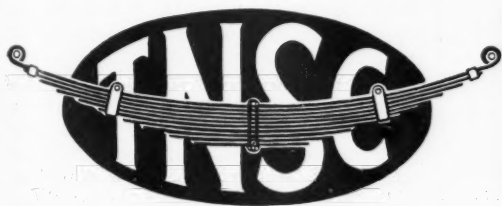
## AN INCREASE IN VALUE

Despite our decision not to increase the price, we have increased the Service Section by 64 pages, increased the number of parts prices by 33%, and have completely revised the Manual for the new \$2.00 per hour averaged national labor rate, which, of course, can be converted as to total job charge to any other rate simply by using the Conversion Table.

**Wait for your Chilton man to call**

**BE SURE THE NAME CHILTON IS ON THE MANUAL YOU BUY**

# TRAINOR *Load-tested* SPRINGS



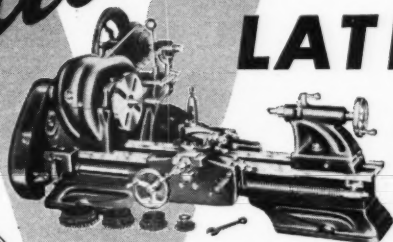
- Complete Springs for Cars, Trucks, Busses
- Main Leaves and Plain Leaves
- Trainor All Steel Helper Springs
- Truck Spring Reinforcing Sets
- Metal Spring Covers
- Universal Center Bolts
- Slip-on Clips for All Springs
- Spring Anti-Rattlers
- Axle Clips
- Tire Irons

Ask Your **JOBBER** or Write Us.

TRAINOR NATIONAL SPRING CO.

New Castle, Indiana, U. S. A.

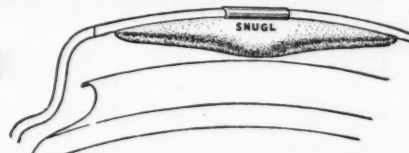
## Atlas LATHES



VITAL EQUIPMENT IN THE  
NATION'S DRIVE FOR VICTORY

LATHES • DRILL PRESSES • ARBOR PRESSES • SHAPERS • MILLING MACHINES

## DON'T OVERLOOK WHEEL BALANCING



As a service to ease the tire situation

Your customers are relying on you to "keep them running" for the duration.

Introduce them to SNUGL Fade-Away Balance Weights and they'll value your service more than ever.

Write today for information about SNUGL, the Balance Weights that are so easy to install, so efficient in operation.

MID-WESTERN AUTO PARTS, Manufacturers  
824 East Elm Street Kokomo, Indiana

## How to Do a Neater Job of Setting Auto Glass!

—and Avoid Danger  
of Glass Breakage!

Setting auto glass with Everseal Channel Stripping is so easy that you can do a bang-up job the very first time you use it. Just pull the stripping around the glass and pinch the ends together. It will stay put while the glass is being pushed into the frame.

With Everseal, the glass goes into place with only a light hand-pressure. No pounding necessary at all! No danger, therefore, of costly glass breakage! Send today for a generous size sample.

EVERSEAL PRODUCTS CO.

3820 Hazelwood

Detroit, Mich.



## RBC ROLLER BEARINGS

Keep 'em Rolling towards

Victory

ROLLER BEARING  
COMPANY  
of AMERICA

26 Whitehead Road TRENTON, N. J.

FOR THE OIL GASOLINE & WATER CONNECTIONS

## VELLUMOID

### VELLUMOID GASKETS

When VELLUMOID Ready-Cut Gaskets are not available, cut gaskets from VELLUMOID Sheet—a tried and proven maintenance product.

Sold through Jobbers. The Vellumoid Co., Worcester, Mass.

### Cadillac Holds Meetings

Cadillac Motor Car Division officials began a series of discussion meetings with the distributor organization at a session March 20, in Hotel Statler, Detroit.

Called for the purpose of checking on the emergency planning which the division began as early as last July, the meetings were conducted by D. E. Ahrens, general sales manager. He was assisted by J. M. Roche, business

management manager, and George Otto, assistant parts and service manager. Similar meetings will be held in Buffalo, Boston, New York, Philadelphia, Pittsburgh, Chicago, Kansas City, Dallas and New Orleans.

"STERLING" MEANS TOP QUALITY IN SILVER...



## "TOLEDO" Means Finest Quality in Precision Motor and Chassis Parts!

ENDORSED BY AMERICA'S  
"MEN WHO KNOW MOTORS!"



Valves... Pistons...  
Engine Bearings...  
Cylinder Sleeves...  
The 100% Complete  
Motor, Water Pump,  
and Chassis Parts!

Toledo has been famous for quality, precision engineering and craftsmanship in manufacture for over 31 years! America's "Men Who Know Motors" have endorsed the complete line by buying more Toledo parts than ever before in history! When you order, make sure that your parts are as good as your own careful workmanship! Specify Toledo, for that extra margin of quality!

# TOLEDO



THE TOLEDO STEEL PRODUCTS COMPANY • TOLEDO, OHIO, U. S. A.

Warehouses: Atlanta • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Indianapolis  
Jacksonville • Kansas City • Memphis • Minneapolis • New York • Oklahoma City • Omaha • Philadelphia  
Pittsburgh • Richmond • St. Louis • Wichita • Los Angeles • San Francisco • Portland • Seattle

**LEONARD**  
THE ONLY  
SPARK PLUG THAT'S!

*Air*  
**Cooled**  
PATENTED

## A "Plug" for Conservation!

THE AIR COOLED center electrode, an exclusive LEONARD feature, dissipates more heat, and does it faster, enabling LEONARDS to out-perform and outlast the ordinary spark plug.

Leonard GAP CONTROL (flat, SIDE-SPACED electrodes) eliminates frequent regapping and prevents power loss.

Test a set of Leonards in your own car and see what a difference they make!

For Longer, Better Service—  
Install Leonards

See your jobber for information on our complete line or write us direct.

LEONARD SPARK PLUG CO., NEWARK, N. J.



Cooling fin and brass ventilated tube carry off the heat.

Washer controls centering; prevents skirt breakage.

The Most Complete  
Line of Passenger  
Car and Heavy Duty  
Spark Plugs.

### New Ad Firm

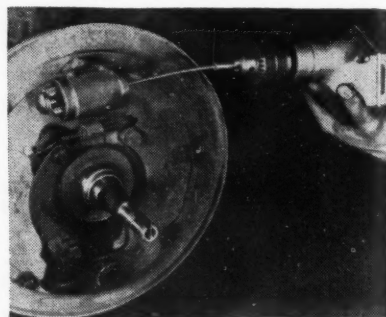
Formation of Sayre M. Ramsdell Associates, Inc., to create and place advertising for a selected group of industrial companies was announced

today. President of the new agency will be Sayre M. Ramsdell of Philadelphia, who has been in charge of advertising and sales promotion for Philco since 1922. Ramsdell will continue as Philco director.

### Cylinder Hone

The Thermoid Co., Trenton, N. J., has announced the introduction of a new universal hydraulic cylinder hone for master and wheel cylinders. The grinding mechanism consists of three stones so mounted that, when the hone is revolved, centrifugal force throws them against the cylinder wall. The stone alignment prevents out-of-round honing, and each stone is pivoted at each end to prevent chatter. An extra stone and holder is provided with each hone.

The new hone will handle all hydraulic cylinders from  $\frac{1}{8}$  in. inside



diameter to  $1\frac{1}{2}$  in. inside diameter, and, because it can be operated with an electric drill by means of a flexible shaft, the drill does not have to be perfectly lined up with the cylinder. Therefore, it can be used to recondition wheel cylinders without removing them from the car.

### Brake Lining Firm

#### Rebuilds Burned Plant

The fire that destroyed the 80 by 48 foot finishing building of the Southern Friction Materials Co., of Charlotte, N. C., did not damage the machinery beyond repair. Accordingly, the company rebuilt two-thirds of the floor space, and, within one month after the fire, moved in and was in partial operation.

Considerable loss was sustained in supplies, materials and finished products, but since finishing and fabricating have never been bottlenecks, there is every likelihood that production can catch up within a short time.

### Kellogg Net Up

The Kellogg Switchboard and Supply Co. in its annual report to stockholders reported net income, after depreciation and federal income taxes, of \$564,210.62 for the year 1941. This compares with net earnings of \$303,241.24 for the previous year. The company earned \$1.95 per share on its common stock, after paying regular dividends on the preferred stock, as compared with \$.95 per share in 1940. Federal income taxes were equivalent to 53 per cent of the net income before taxes. All taxes amounted to \$780,500 as compared with \$172,000 in 1940.



FOR EXAMPLE:

cleaning cooling systems  
this easy, time-saving way!

Are cooling system maintenance jobs crowding your shop these days? Then save time and effort and turn out more of this important work by putting this performance-proved idea to work.

After draining anti-freeze, fill system with solution of Oakite Penetrant. Circulate by running motor . . . then drain, flush and refill. Method removes loose scale, dirt and grease without harming metal surfaces or hose connections. With system clean, cooling efficiency is stepped-up and motor performance improved.

#### MORE TIME-SAVING IDEAS FREE!

Illustrated 36-page manual tells how to save time, get better results on 21 other important jobs. Your copy is FREE! Write for it today!

OAKITE PRODUCTS, INC., 24C Thames St., New York  
Representatives in All Principal Cities of the United States and Canada



## Now THE LEADER IS PLOMB



★ 35 years ago the first Plomb tool was made in a small Los Angeles blacksmith shop.

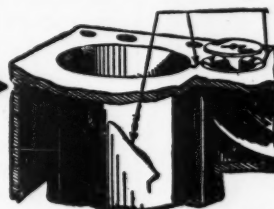
Today more than a generation of quality and service has made Plomb tools the first choice of millions of mechanics everywhere — has made the Plomb Tool Company the world's largest manufacturer of quality service hand tools for mechanics.



PLOMB TOOL COMPANY • LOS ANGELES, CALIF.

# WONDERWELD

*Is Easy to Use!*



**QUICK ACTING  
Guaranteed**



No complicated equipment or special training necessary — anyone can use Wonderweld. It is the perfect and guaranteed Repair for cracked blocks, cylinder and valve ports. Simple, easy and profitable — works in 30 minutes! **Highly imitated but never equalled!**

Ask Your Jobber ★ Send Trial Order  
Or Write for Folder

**MILLER MFG. COMPANY**  
1100 North 32nd St. Camden, N. J.  
Warehouse Service in Principal Cities

## TIRE THIEVES *Outwitted!*

by Simple Ingenious  
Fool-Proof Device

Just tell any car-owner about Wilson's Combination Tire and Wheel Lock, and he'll want it right away — without his even seeing it. It's a natural seller . . . means quick sales, big profits for you. Tire thieves just haven't a chance with this device on the car, under the hub-cap.

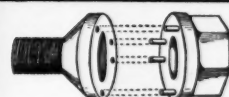
Drivers are Clamoring for it!

Order your stock of Wilson Combination Tire and Wheel Locks TODAY. Every day lost means sales lost! All goods F.O.B. Chicago Shipping wt. 1/2 lb. per set. Freight prepaid on shipments of 100 lbs. or more. Terms cash or C.O.D. If check is mailed with order, deduct 3% for cash and save C.O.D. charges. Deposit of 25% required on all C.O.D. shipments.

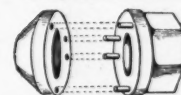
**NO WHEELS TO BALANCE**

**WILSON INDUSTRIES, INC.**

Dept. M108, 545 W. Lake St., Chicago, Ill.



This type for all cars using stud bolts.



This type for all cars using lug nuts.

For FORDS & CHEVROLETS  
Complete set of 5 Locks and Master Keyed Stud for loosening and tightening.

Retails for \$4.50

Your Cost Only **\$2.70**

OTHERS  
Complete Set of 4 Locks  
Retails for \$4.00

Your Cost Only **\$2.40**

The prongs on the master key head and the corresponding holes, through different positioning, permit an endless variety of locking combinations.

# ONLY SURE WAY

**to seal a tire  
valve is with  
an air-tight cap**



**After pressure testing  
always 'recap' the tire valve  
and save rubber**

**GUARANTEED AIR-TIGHT UP  
TO 250 POUNDS PRESSURE**

A. SCHRADER'S SON, BROOKLYN, N. Y.  
Division of Scovill Manufacturing Company, Inc.

## Club Raps Ickes' Threat

### To Punish Speeders

Secretary of the Interior Ickes' implied threat that a motorist convicted of violating speed or other traffic regulations will be deprived of gasoline under the rationing system is regarded by the Keystone Automobile Club as "a menacing and dictatorial use of federal power."

"We can see no valid reason," said a statement by the club, "for linking enforcement of the traffic laws with gasoline rationing. One is a purely local and state matter and the other is a federal rule made necessary by the exigencies of war."

"If punishment for violation of the proposed nation-wide 40-mile limit is to include abolition of a citizen's privilege of buying gasoline in accordance with the provisions of his classification, it is quite obvious that a great many motorists are going to be dealt with more harshly than their violation merits."

"We believe all motorists will make an earnest effort to comply with the President's request for a universal 40-mile limit if the laws are changed to accord with his wishes. We know that, under varying circumstances, some drivers are going to be caught driving faster than that limit, without any intent on their part to flout the regulations. We think they should, in accordance with the facts, be punished under the laws of the state or locality where the offenses—whether wilful or unintentional—is committed."

## Hydraulic Brake Bleeder

The Barrett Equipment Co., 2101 Cass Ave., St. Louis, Mo., has a new hydraulic brake filler and bleeder tank for one-man operation. It bleeds and fills the system in one operation under controlled air pressure. No pedal or lever pumping is necessary, and no air can enter the system during the operation. The tank is equipped with a positive acting safety valve, air pressure gage and an automatic shut-off valve.

## Asks Tires for Tow Cars

Inclusion of emergency road repair equipment operated by the nation's 55,000 service establishments in the list of vehicles eligible to obtain tires under the rationing program was urged today by the American Automobile Association.

In a letter to Leon Henderson, in charge of civilian supplies in the new War Production Board, Thos. P. Henry of Detroit, Mich., president of the national motoring body, recommended that special consideration be given to emergency equipment which handles automobiles that break down on the streets and highways and are unable to proceed under their own power.

## WITTEK NOC-OUT HOSE CLAMPS



Standard throughout the industry for original equipment and replacement. For Radiator, Heater, Booster Brakes and High Pressure hose connections. Sold by dealers and jobbers everywhere.

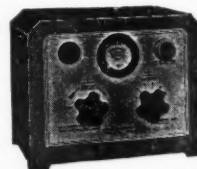


## AIR RAID SIGNALS

Can be operated from gas station air supply. Suitable for coding for Volunteer Fire Dept. Automobile types increase driving safety. Can be sounded very soft or very loud as occasion demands. Used on the Greyhounds. Write for Literature.

**BUELL MANUFACTURING CO.**  
2991 Cottage Grove Ave., Chicago, Illinois.

## BUY NO BATTERY CHARGER



Until You Have Investigated The VALLEY SUPERDUTY CHARGER

● Fully Guaranteed for Two Years—Valley, modernized superduty chargers will give you the utmost in value . . . enable you to cash in on the big profits in battery charging. Valley chargers are easy to operate . . . no moving parts . . . connecting to the lighting circuit. Low in operating cost. Order yours today. Model SG-12 charges 1 to 12 6 volt batteries—\$28.00.



**Valley Electric Corp.**  
4221 Forest Park Blvd., St. Louis, Mo.

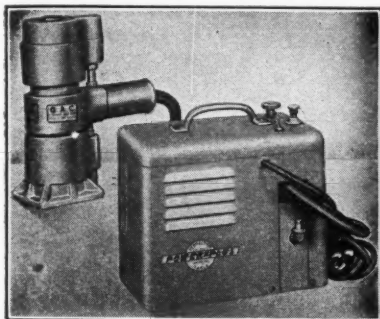
**For Engine Bearings  
Clutch Plates & Parts  
King Bolt Sets**

**Monmouth  
is the name**



# G.A.C. PRODUCTS SAVE MAN POWER, TIME AND MONEY

**They help get today's  
jobs out better and  
more efficiently.**

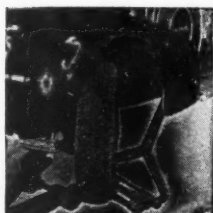


## TWO - SPEED, TWIN CYLINDER POWER UNIT

High speed pumps quickly force ram to contact load, then automatically cut out and powerful slower speed pumps lift load. Uninterrupted flow of power to ram.

## H-289 UNIVERSAL FENDER SPREADER

For close work where wide spreading is necessary and for spreading between fender and fender well. Closes to 1 3/4". Opens to 19 3/4" with 6" ram travel. \$14.75.



## The Only Double-Acting Push-Pull HYDRAULIC JACK

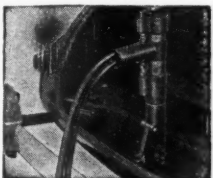
Supplies direct pull, for the repair of box channels, rear trunk racks, door posts, etc. Two units handle any type of body aligning, frame work, fender straightening, knee-action adjustment, steel running board straightening.

Operates in any position, even upside down. Safety valve prevents overloading, bending or breaking.

## Power In A Small Area H-80

## PUSH-PULL SPREADER

For use with Perfection Push-Pull Jack. Ideal for trunks, pushing out sills, etc. Fits into 1" space. Open width 5 1/2". \$9.25.



Order from your jobber or write for catalog

**G. A. C. MFG. CO., Ashland, Ohio**



## GM Gives Union Plan To Speed Production

General Motors in March sent a letter to the United Automobile Workers (CIO) on making a series of proposals for revision of its agreement with the union. Negotiations on revision of the agreement, which expires April 28, started on that date.

In announcing the proposals, C. E. Wilson, president of General Motors, declared that they are designed to increase war production by improving morale, by more clearly defining certain working plans and methods of pay, by restoring incentives so as to compensate individual workers willing and able to increase their output, and by revising the handling of management-union relations so there will be "more work and less talk."

Among the proposals were:

1. Discontinuance in union literature attacks and accusations of "speed up" on the management's efforts to increase production of war materials.

2. For the duration of war, elimination of any requirement for payment of double time under any circumstances.

3. Recognition by the union of management's right to establish any system of shifts the management decides is necessary to boost war production.

4. Support by the union of individual piece work or other incentive method of pay when it has been determined by the management that the introduction of such method of pay will step up production of war materials. Any such change would be negotiated with the shop committee before being placed in effect.

5. Provision for differentials in wage rates in certain job classifications so employees who produce more and better work may be rewarded by being paid the maximum rate.

6. Promotion or transfers to higher-paid jobs on the basis of merit, ability, and performance of the employee.

Three other proposals recommend the reduction in the number of committeemen in the plants and simplification of the method of handling complaints.

## Brooklyn Dealers Honor Ebbert, Retiring Manager

Nearly 300 Brooklyn and Long Island automobile dealers put aside their business woes and worries to pay tribute to Ralph Ebbert, retiring manager of the Brooklyn and Long Island Auto Dealers Association, at a farewell dinner held in Brooklyn recently.

Ebbert, after 22 years with the association, resigned to become Director of Industrial Relations of Carrier Corp., Syracuse, N. Y., world's largest manufacturer of air-conditioning equipment.



**in all standard tire  
valves regardless  
of the type of valve  
or size of tire**




**When repairing tubes  
replace valve cores if old,  
worn or damaged**

## THE "ACE" OF STANDARDIZATION

A. SCHRADER'S SON, BROOKLYN, N. Y.  
Division of Scovill Manufacturing Company, Inc.

**Fuel Pump  
ACCURACY  
means better  
PERFORMANCE**



When a thing is made better you have a better product. It is as simple as that. AIRTEX Fuel Pumps due to micrometric accuracy in manufacture not only give:

- Better Performance
- Longer Wear
- Most trouble free operation

But, only AIRTEX Pumps include:

- AIRTEX Diaphragms—guaranteed for 50,000 miles.
- AIRTEX Exchange Plan enables Jobbers to accept old pumps as "trade-ins."
- AIRTEX Exchange Service secures New Pumps at low Exchange Price.

**AIRTEX**  
Write for catalog and ask your jobber for AIRTEX  
**AIRTEX AUTOMOTIVE CORP.**  
Fairfield, Illinois

Where  
Secure  
Seals Are  
Vital



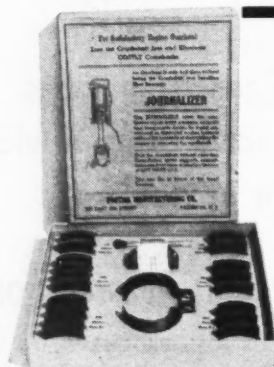
**VICTOR**  
GASKETS, OIL SEALS  
GREASE RETAINERS

Make Big Profits on Small Investment In  
**SHURHIT  
IGNITION  
PARTS**



Ask your Shurhit jobber or write us for details on General Ignition Assortments of fast-moving parts . . .  
Contact Points . . .  
Condensers . . .  
Rotors . . . Caps  
Coils . . .  
Switches, etc.

**SHURHIT PRODUCTS, INC.**  
Waukegan, Ill.



## Save TIME and LABOR

### TRUE OUT-OF-ROUND CRANK PINS WITH JOURNALIZERS

You can do an absolutely accurate job without dismantling the engine, removing counterbalances, front axle or other chassis members.

JOURNALIZERS inserted in the connecting rod head do this trying operation quickly and accurately.

Shopmen everywhere are very enthusiastic. Any mechanic can use them. For all cars, trucks, buses and tractors.

Contact your Jobber today or write us direct.

**POSTMA MANUFACTURING CO.**  
691 East 18th Street Paterson, N. J.

## Automotive Electric Assn. Names Shank President

At a recent meeting of the board, four newly elected directors of the Automotive Electric Association took office and the following officers were elected for 1942:

J. A. Shank, president, manager, Parts and Service Division Electric Auto-Lite Co., Toledo, Ohio.

C. F. Conn, vice-president, Manufacturing Division Sales Manager, Trico Products Corp., Buffalo, N. Y.; Barry Cool, vice-president, Distribution Division Electric Equipment Co., Los Angeles, Calif.; H. E. Josselyn secretary - treasurer, King - Seeley Corp., Ann Arbor, Mich.; S. H. Fulton, assistant secretary, Detroit, Mich.

The Automotive Electric Association was organized in 1917. The many accomplishments of the association since its organization that have been of direct benefit to the parts and service phase as well as the automotive industry in general, were reviewed. The members of the board, by resolution, extended their appreciation to retiring President F. B. Willis, director of sales of Bendix Products Division, for the splendid service he rendered the Association during his two terms as President.

## National Garage Tools Enters Automotive Field

National Garage Tools, Inc., 809 S. Water Street, Jackson, Mich., was granted a charter by the Michigan Securities and Exchange Commission November, 1941, to manufacture and sell garage tools and automotive parts. The officers are as follows:

A. L. Dowley, president-treasurer; Dan E. Ritson, vice-president; J. C. Mick, secretary.

The officers all were formerly connected with the original National Machine & Tool Co. who liquidated in February, 1941. They are again entering into the automotive field with a complete line of specialized automotive tools formerly made by the old National Machine & Tool Co. They will continue to sell to the automotive trade through the automotive wholesalers and have retained most of the representatives who formerly represented the National Machine & Tool Co.

# PAR

## AIR COMPRESSORS

(Write for Catalog "A")  
MODERN EQUIPMENT CORP.  
DEFIANCE, OHIO, U.S.A.

## FITZGERALD

GASKET CRAFTSMEN SINCE 1906

## GASKETS

The complete line  
that completely satisfies

The Fitzgerald Manufacturing Company  
Torrington, Conn.

THERE'S ONLY ONE



**BURN-OUT PROOF  
DIRECTIONAL SIGNAL SWITCH**

In complete sets of Signal-Stats or as a replacement switch—ASK YOUR JOBBER

**SIGNAL-STAT CORPORATION**  
48 JAY STREET BROOKLYN, N. Y.

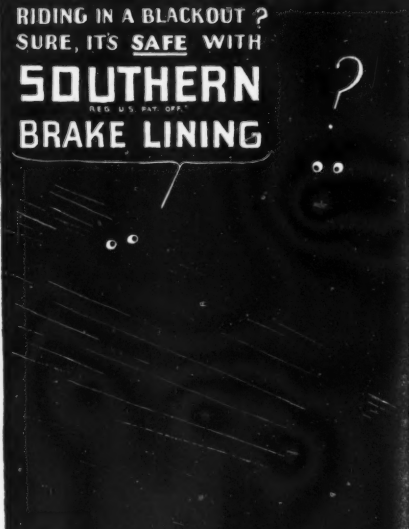
RIDING IN A BLACKOUT?  
SURE, IT'S SAFE WITH

# SOUTHERN

REG. U.S. PAT. OFF.

## BRAKE LINING

?



# SOUTHERN

FRICITION MATERIALS CO.-CHARLOTTE, N.C.

## Battery Hoarding Perils Cited by Authority

The increasing sales of new batteries, particularly noticeable the last 90 days, may represent a boom for the dealers but it likewise places a responsibility on them, according to B. F. Morris, president of the Association of American Battery Manufacturers.

Many of these batteries were not placed in operation in the cars of those purchasing them and consequently must have been intended for future use. Yet many of those purchasing such batteries for the future do not realize the perishability of the commodity they purchased.

Certainly the perishability of a battery, when left idle, should be pointed out to persons obviously buying a battery for future use and such persons should be urged to return every 30 days to have these batteries recharged. A battery cannot be "hoarded"—without periodic recharging.

Naturally, any battery dealer realizes this. But he does not always realize that, unless he sees to it that such batteries are brought back for recharging, he may have a dissatisfied customer. And this process may be duplicated many times over—and the immediate gain in dollars and cents may be more than offset in future ill will.

Such extra battery sales, unless followed up, may result in not only a waste of the customers' money but in a waste of materials that might have gone into war production. It is a good thing even to discourage the sale of "extra" batteries. Every dealer should insist on getting the old battery when selling a new battery—to help maintain normal profit through turning in the old batteries for scrap lead—if for no other reason.

But if you do have to sell an "extra" battery, make sure that you institute a follow-up system to see that it remains "alive" through periodic recharging.

### Enlarges Plant

Manufacturers Screw Products, 212-222 W. Hubbard St., Chicago, have acquired another 15,000 square feet of floor space and installed additional screw equipment of the most modern type. The battery of new machines went into production March 2. B. J. Sackheim stated the plant is operating virtually 100 per cent on defense orders.

### Branch Moved

The DeVilbiss Co. has moved its St. Louis, Mo., sales and service branch to 2737 Washington Ave. This new location with its improved parking facilities will make it more convenient for the trade to take advantage of the services offered by the branch.



## BRAKE PARTS, FLUID & TOOLS

**Yes,  
We Are Working!**

**W**ITH all of the facilities at our command we are working to fill the war orders that have been handed to us by the Government.

At the same time, insofar as regulations permit, we are endeavoring to keep all of our old customers and friends supplied with the materials they need.

Yes, we are working! But we're not too busy to pause for the moment to thank the thousands of users of EIS products for their loyal support in the past.

EIS MANUFACTURING CO., INC.  
MIDDLETOWN, CONN.



**Try  
PERFECT SEAL  
at no cost  
On Your Next  
Gasket Job**

Pages of advertising won't tell the complete story of PERFECT SEAL'S superiority, as well as one trial by you . . . in your own shop. So . . . we'll send you a sample tube of PERFECT SEAL . . . enough for a complete head gasket job . . . at no cost. Send the coupon today, and learn for yourself why most truck and automobile manufacturers use PERFECT SEAL for production line assembly, and recommend it to their dealers and distributors.

PERFECT SEAL works perfectly on head, pan and water plug gaskets; radiator and water hose connections; spark plug and stud bolt threads. TRY PERFECT SEAL . . . YOU'LL BE CONVINCED.

**P. O. B. MFG. CO., INC., CINCINNATI, O.**

Send me a free tube of your Perfect Seal. I'll try it at no cost to me.

NAME \_\_\_\_\_

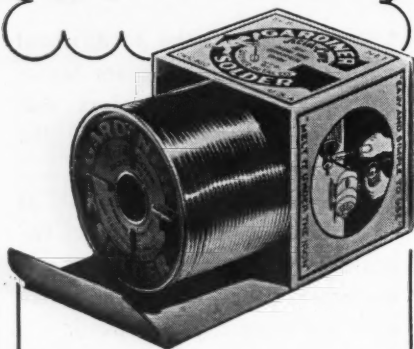
ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

JOBBER'S NAME \_\_\_\_\_

M.A.

*Sets the Pace*  
**FOR QUALITY  
and ECONOMY**



• The quick-acting flux of Gardiner Acid-Core Solder permits exceptionally fast, clean work. Unusually high tensile strength insures lasting bonds. Yet, thanks to modern methods exclusive with Gardiner, these better solders are low in first cost and most economical to use. Other Gardiner products famous throughout the automotive industry for top performance and bottom cost are Solid Wire, Bar and Body Solders . . . and Permanent Lining Babbitt metal.



4839 S. Campbell Ave., Chicago, Ill.

**WORLD'S  
FASTEST TROUBLE SHOOTER**



**MAKES MONEY  
SAVES TIME**  
Make positive tests on Condensers, Coils, Lights, Continuity, Generators, Shunts, Grounds, Leaks, etc. With this simple Model 100 Analyzer. Used by Army, Navy—approved by 50,000 users, as the fastest, most economical trouble shooter made—saves enough time and money in 30 days to pay for itself. Ask your local jobber—or write for FREE information.

Sold on 30 Day Guarantee  
**T. & H. MFG. CO., 811 E. 31, K. C., Mo.**

**PERMAG  
Cleaning Compounds**

Kold Kleen used for heavy work or for small parts. Cleans rapidly, thoroughly, economically.

Write for details.

**MAGNUSON  
PRODUCTS CORPORATION**

Main Office 50 Court St., Brooklyn, N. Y.

Mfgs. Specialized Scientific Cleaning Compounds for the auto and truck industry. Warehouses in principal cities. In Canada: Canadian Permagon Products Ltd., Montreal, Toronto.

**Bear Presents New**

**Talking Service Film**

As one of the major features in its program in the nation-wide campaign to conserve rubber, Bear Manufacturing Co., in cooperation with its jobbers, is presenting a talking film, under the title, "An Ounce of Prevention."

This film pictures the factory service man instructing the young or new mechanic—telling him how to impress every car owner with the vital need today for steering service—showing him the various steps in making a complete check-up—giving him step-by-step instruction in testing for correct camber, caster, toe-in, toe-out and king-pin inclination and how to make all necessary adjustments—demonstrating the way to prove the need for wheel-balancing and to correct unbalanced wheel conditions.

**Edward Riley Named**

**Vice-President by GM**

Edward Riley has been elected a vice-president of General Motors by the board of directors of the corporation, it is announced. He succeeds Graeme K. Howard, who has resigned as vice-president in charge of Overseas Operations. Howard is now serving in Washington as deputy chief, Motor Transport Division, Quartermaster Corps, U. S. Army. Riley has been general manager of General Motors Overseas Operations.

**Timken Adopts War Slogan**

"Timken's Job: To Axe the Axis with Axles!" has been adopted by The Timken-Detroit Axle Co. as its war-time slogan and goal. The slogan made its first appearance this week on pay envelopes and in trade-paper advertising.

The company has been operating for nearly two years on a 24-hour, 7-day-a-week schedule. Despite this all-out effort, facilities have been further expanded and production totals continue to climb.

Products include axles and brakes for all types of Army vehicles, gun limbers and bogies, transfer cases for multi-wheel drive vehicles, and tank transmissions.

HERE'S A HORSE OF A DIFFERENT COLOR



STOP TROUBLE BEFORE IT STARTS

**LION**  
*is still able to  
deliver the GOODS!*

Now, in these stirring times, it is paying you **DIVIDENDS** for Lining Up With **LION**.

Dependable Quality  
Replacement Parts For  
**FORD  
CHEVROLET  
PLYMOUTH**

**We are still supplying our old customers the bulk of their requirements!**

**LION AUTO PARTS & MFG. CO., INC.**

1920 S. Michigan Ave., 2214-20 Main St., 1239 Osborne St.  
CHICAGO DALLAS MONTREAL

**National  
GARAGE TOOLS INC.**  
**GEAR  
PULLERS**

RING GROOVE CLEANERS - AUTO CREEPER CASTERS - EXPANSION REAMERS - SOLID REAMERS - PISTON RING COMPRESSOR PULLER FOR TIMKEN BEARING AND SHAFTS

WRITE FOR LATEST GENERAL CATALOG

**National Garage Tools, INC.**  
809 WATER ST., Jackson, Michigan

**Reduce Tire Wear!**

Save Rubber  
for Defense!

Wheel Balancing with L & H Weights reduces tire wear 20% to 25%. Call this to the attention of your customers. It means many extra service jobs.



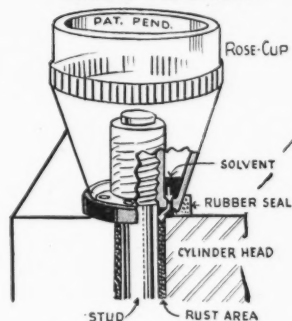
**HARLEY C. LONEY CO.**  
16893 Wyoming  
Detroit, Mich.



**Rubber Parts  
Last Longer  
when you use**

**PURITAN  
Super  
AIRCRAFT QUALITY  
BRAKE FLUID**

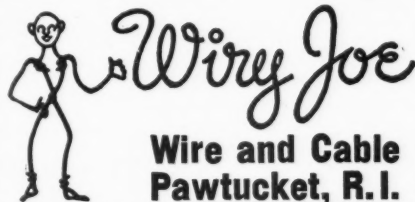
**NOW!**  
**With ROSE-CUPS and ROZENE**  
**THE 100% PENETRATING**  
**OXIDE SOLVENT**



**LOOSEN ANY FROZEN CYLINDER HEAD**  
**IN 30 MINUTES**

Proof and Testimonials from  
 Leading Repair Shops, Illustrated  
 Color Circular Sent on Request.  
 Write Now for Low Introductory  
 Offer.

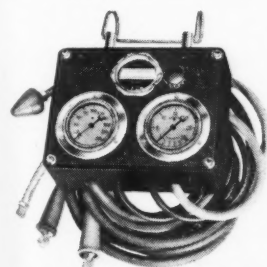
—YOU NEED THIS EQUIPMENT—  
 SKILLED HELP UNNECESSARY  
**ANTI-RUST CORP., 336 Canal St., N. Y., N. Y.**



## STROMBERG

MODEL K1  
**Portable ANALYZER**

Combining compression, vacuum and fuel  
 pump pressure gauges for testing fuel  
 pumps and all vacuum engine testing, as:  
 Carburetor adjustment, valves, gaskets,  
 etc. Coil test with variable spark gap  
 calibrated 0-28 mm. with large Geissler  
 tube enables easy miss  
 detection.



LIST  
 PRICE  
**\$22.50**

Be in position  
 to help  
 your cus-  
 tomers save  
 gas and oil.

Install a Stromberg Model K1 analyzer.  
 See your distributor or write us.

**E. A. STROMBERG CO., INC.**  
 1160 North Howe Ave., Chicago, Ill.

### Spicer New President of World-Bestos Corp.

Following an announcement last  
 month of the election of Donald H.  
 Spicer as a director of World-Bestos  
 Corp., word comes now of his ap-  
 pointment to be  
 president of the  
 company. As  
 president, Spicer  
 will continue his  
 responsibilities as  
 general manager  
 of the company.  
 With home office  
 and factory at  
 Paterson, N. J.,  
 the company's  
 volume is reach-  
 ing new highs in



D. H. Spicer

the manufacture of Grafil friction  
 materials for the replacement market  
 and for the military forces of the  
 U. S.

This new appointment tops the  
 rapidly progressing career of one of  
 the automotive supply industry's  
 younger executives. An alumnus of  
 Case School of Applied Science  
 (Cleveland), Spicer has a thorough  
 technical and practical knowledge of  
 all phases of the brake-lining busi-  
 ness—research, production and sales.

### Ralph J. Archer

Ralph J. Archer, 61, vice-president  
 and sales manager of the Willys-  
 Overland Motors, Inc., Toledo, Ohio,  
 died March 19, in the Mayo Clinic,  
 Rochester, Minn., of pneumonia. He  
 had been in failing health for several  
 months. On March 16 he underwent  
 a stomach operation. He failed to rally  
 after the operation.

Archer was one of the original  
 members of the Overland administra-  
 tive staff of John N. Willys as well  
 as of the reorganized company. For  
 many years he was vice-president  
 and manager of the Willys Export  
 Corp., a subsidiary.

Archer was born in Chillicothe, O.  
 He received his early education in  
 Chillicothe schools and in a New York  
 military academy. He was a mem-  
 ber of the Chamber of Commerce,  
 and also a member of the export com-  
 mittee of the Automobile Manufac-  
 turers' Association.

### RIMAC HEX DIES AND TAPS

*for a Solid Grip!*

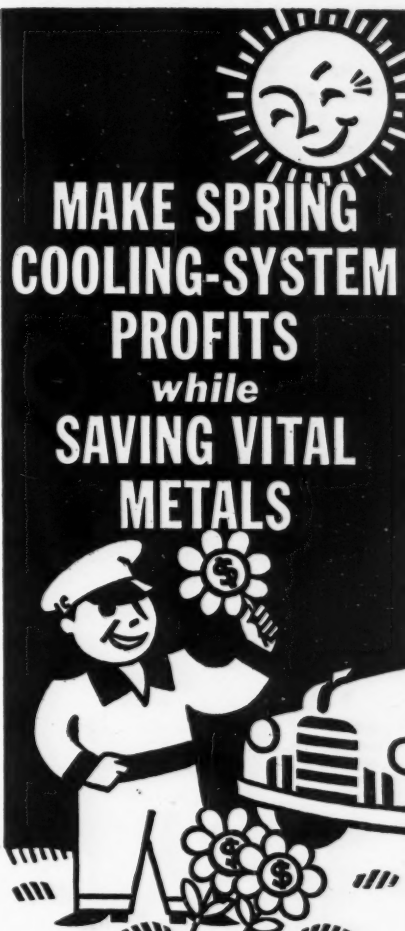
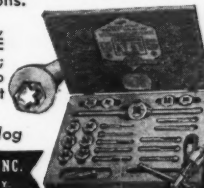
Rimac HEXSET has all dies 1" Hex outside  
 for firm grip in die-stock, wrench or ratchet.  
 Tap wrench has 3/8" square tap opening  
 to fit ratchet extensions.

SET No. 77—11 taps,  
 11 dies, 5/16-1/2" SAE  
 and USS; 1/8" pipe;  
 9" die stock; tap  
 wrench. Dealer net  
 \$9.75

Send for Rimac Catalog

**RINCK-McILWAINE, INC.**

16 HUDSON ST. NEW YORK, N. Y.



Three-way service and profit oppor-  
 tunity: (1) Save vital metals; (2)  
 save money for motorists; (3) make  
 66 2/3% profit plus labor revenue.  
 Nor'way self-selling products protect  
 against leaks, rust, and corrosion,  
 help cooling systems to outlast the  
 war. Profit by conserving! Sell and  
 service with—

### NOR'WAY COOLING-SYSTEM PROTECTION

**NOR'WAY CLEANER:** Loos-  
 ens rust, grease, and scale  
 without reverse flushing.

**NOR'WAY QUICK FLUSH:**  
 Cleans while car is in service.

**NOR'WAY STOP LEAK:**  
 Flows freely in system.

**NOR'WAY ANTI-RUST:** Pro-  
 tects against corrosion of all  
 six metals.



*Split-Case Assortment  
 at Full-Case Price*

**SUMMER DATING  
 ORDER FROM YOUR JOBBER TODAY!**

**COMMERCIAL SOLVENTS**  
*Corporation*

17 East 42nd Street, New York, N. Y.

# Advertisers' Index

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